



ANNUAL REPORT

1955

DEPARTMENT OF AGRICULTURE
NEW SOUTH WALES



1955

PARLIAMENT OF NEW SOUTH WALES

REPORT
OF THE
DEPARTMENT OF AGRICULTURE
FOR THE
YEAR ENDED
30TH JUNE, 1955

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CONTENTS

	Page.
DEPARTMENT OF AGRICULTURE, AS AT 30TH JUNE, 1955	9
Production Trends	11
Food Production Policy	11
Australian Agricultural Council and Standing Committee on Agriculture	12
Food and Agriculture Organisation	12
Wheat Stabilisation	12
Expenditure—Summary	12
Capital Works	12
Flood Relief	12
Gift Fodder Appeal	12
Stock Buying Delegation	12
Farrer Memorial Trust	12
Botanic Gardens and Sydney Domain Trust	13
McGarvie Smith Institute	13
Agricultural Regions	13
Co-ordinated Extension Service	13
Agricultural Extension Grant	14
Country Killing	14
Lamb Branding	14
Meat Inspection Service	14
Wheat Handling	14
Cattle Tick Eradication	14
War Service Land Settlement	14
State Fodder Conservation Scheme	14
Agricultural Research Institute	14
Research/Extension Committee	15
Committee for Co-ordination of Agricultural Research	15
M.I.A. Agricultural Service	15
Foot and Mouth Disease Conference	15
Myxomatosis	15
Tuberculosis Survey	16
Poultry Improvement Plan	16
Poultry Efficiency Conference	16
Apprenticeship Scheme for Dairy Produce Factories	16
Experiment Farms and Stations Branch	16
Legal and Registration Branch	16
Grain Elevators Act; Wheat Industry Stabilisation Act; Noxious Insects (Amendment) Act; Wine Adulteration Repeal Act; Pastures Protection (Amendment) Act; Swine Branding Act; Regulations, Proclamations, etc.; Prosecutions; Agricultural Holdings Act; Registrations; Veterinary Surgeons Board.	
Personnel Section	17
Staff Changes	17
Appointments; retirements, deaths; officers returned from overseas; officers overseas.	
Staff Numbers	18
Architects Branch	18
Pastures Protection Service	18
Grasshopper control campaign; revocation or curtailment of travelling stock reserves; dingo destruction boards; leases of public watering places; soldier settlement areas; salaries of inspectors and secretaries; legislation, etc.	
Biometrical Branch	19
DIVISION OF PLANT INDUSTRY	19
General	19
Agricultural Extension Grant; Dairy Industry Extension Grant; flood relief.	
Wheat	19
Grain quality; varieties; diseases; improvement programme; world rust nursery; durums; fertiliser trials; wheat/pasture rotations; field wheat competitions; foundation seed; registered seed; Departmental varieties' success in field wheat competitions.	
Oats	21
Variety tests; trends; breeding; selections.	
Barley	21
Breeding; trials; seed production; fodder trials.	
Rye	21
Maize	21
Improvement programmes; district trials; Hybrid foundation seed, and certified seed production; maize investigations.	
Sweet Corn	21
Hybrid foundation seed; breeding programme.	
Popcorn	22
Hybrid performance; certified seed production.	
Sweet Sorghum	22
Improvement; certified seed production.	
Grain Sorghum	22
Foundation seed production; variety, irrigation and fertiliser trials.	
Broom Millet	22
Improvement programme; selection; introductions.	
Fodder Millets	22
Sudan Grass; Columbus Grass; Fodder Cane; Summer Legumes; Winter Legumes	22
Rice	22
General; variety improvement programme in Wakool District; factors in record crop; rice in Deninein Irrigation District.	
Tobacco	22
Breeding; field trials.	
Hops	23
Yield and quality tests at Bathurst.	

CONTENTS—*continued.*

	Page.
Linseed; Safflower; Peanuts; Castor Beans; Sunflower, etc.	23
Vegetable Section—General	24
Potatoes	24
Breeding; selections; new variety—Walanga; scab resistance trials; introductions; storage tests; soil fertility investigations; cooking tests; variety trials; Seed Certification; moth control demonstrations; chemical treatment of seed potatoes.	
Tomatoes	25
Breeding; hybrids; introductions; hybrid seed production School.	
Beans	25
Breeding; disease resistance; selections; introductions; Seed Certification.	
Green Peas	26
Breeding; introductions; selections.	
Onions	26
Hybrid introductions.	
Cucurbits; Beetroot; Crucifers; Sweet Potatoes; Carrots	26
Soil Conditioners	26
Pastures	27
Sown acreage increases; seed production increases; research "team" approach; pasture investigations at Colleges and Experiment Farms; pasture work in agronomists' districts; extensive survey of minor element trials; Rhizobia; superphosphate trend; management; Agricultural Extension Grant demonstra- tions.	
Weed Control.....	28
Extension Grant demonstrations for serrated tussock; grants to Local Government; general extension activities; weed conference; notes on individual weeds; use of defoliant; aircraft in agriculture.	
Seed Testing Laboratory	29
General; seed testing statistics; value of seed tested; pasture seed certification; more seed vendors; legal actions—Agricultural Seeds Act, Stock Medicines Act.	
Irrigation	30
Hunter Valley Conservation Trust; Drainage Act Conference; McLeay County Council Flood Mitigation Committee; Wakool Land Use Committee; Blowering Dam Committee; Abermuden Committee; Denibootea; Flood Mitigation and Control; Farm Water Storage.	
War Service Land Settlement.....	31
Increase in activities; promotion cases; acquired estates; Tullakool; Langtry Park.	
Rural Electricity Advisory Service	31
DIVISION OF HORTICULTURE	31
Regulatory Work	31
Quarantine services; seed importations; living plant importations; orchid, bulb, corm, tuber, basketware importations; parcel post; passengers' luggage; timber importations.	
Export Inspections	32
Citrus; pomes; grapes; flour and rice.	
Interstate Shipments	32
City Markets and Retail Inspections	32
Citrus; stones; tropical fruit; tomatoes; potatoes; fruit shops and barrows; con- demnations.	
District and Suburban Inspectional Work	33
Fruit fly; citrus gall wasp; district potato inspections.	
Extension Campaigns	33
General—Committees, etc.	33
Committee of enquiry—Mid Murray Dried Fruit Area; Advisory Committee—Fruit Cool Storage Investigations; Advisory Committee—Fruit and Vegetable Processing Research; Commonwealth Dried Fruits Processing Committees; 6th Australian Canning Convention; Canning Fruits Advisory Committee.	
Citrus Industry	33
Extension work; renovation and alternative land use; extension service in soldier settlements; citrus industry trends.	
Citrus Research	34
Wastage; lemon storage; spore load investigations; improvement committees' activities; propagation; rootstock trials; pre-harvest drop sprays; Gosford Citrus Experiment Station; Narara Section; Yanco Experiment Farm plantings; Coomealla Horticultural Research Station; Leeton Experiment Farm planting; Griffith Viticultural Nursery citrus plantings; Co-operative Bud Selection Society; exchanges of citrus plants and seed.	
Banana and Other Tropical Fruit Industry	35
General; Banana Growers' Federation; Extension Service; Regulatory Service; Bunchy Top Control Campaign; Trends.	
Research	35
Plastic bunch covers; irrigation and fertiliser trial; planting distances; Tropical Fruit Research Station; trace elements in banana industry; freezing of pineapples.	
Passion Fruit Industry	36
Pome Fruit Industry	36
Trends; Willigobung Settlement.	
Pome Fruits Research	37
Rootstock trials; hormone and foliar sprays; urea foliar sprays; apple and pear breeding; apple storage; twist of Gravenstein apple.	
Stone, Dried, Berry and Miscellaneous Fruits, and Nuts	37
Extension work; trends in stone and dried fruit industries.	
Stone Fruit Research	38
Cherry breeding; stone fruit thinning; freezing of stone fruits and berries; peach pruning trial; peach breeding and selection; apricot breeding; internal break- down of apricots; apricot pruning; pre-harvest drop of prunes; prune fertiliser trials; prune stock trials; variety trials.	

CONTENTS—*continued.*

	Page.
Strawberry Investigations	38
Nuts	38
Pecan; almond; hazel; macadamia.	
Wine and Table Grapes	38
Griffith Nursery and Narara Sub-station in relation to Phylloxera resistant vine stocks.	
Fruit Packing Extension Service	39
Fruit Preserving Extension Service	39
DIVISION OF ANIMAL INDUSTRY	39
Foot and Mouth Disease Conference	39
Disease Incidence	39
Anthrax; bovine pleuropneumonia; brucellosis (cattle); T.B. (cattle); T.B. (pigs); Johne's disease; trichomoniasis; sterility in dairy cattle; brucellosis-free herd scheme (swine); avian T.B.; blow fly strike; internal parasites; fluke infestation in cattle; sheep foot-rot; pregnancy toxæmia; malignant catarrhal fever; photosensitisation; urinary calculi in wethers; leptospirosis; hypocuprosis; ornithosis; neo-natal lamb mortalities; infectious laryngo tracheitis; ovine brucellosis; external parasites of sheep.	
Animal Quarantine Service	41
Migrant baggage; animal products' entry; small animals' entry; cattle imports; monkeys for Salk vaccine; bovine semen; caged birds; distemper vaccine.	
Cattle Compensation Act	42
Stock Foods and Medicine Act	42
Meat Inspection Service	42
State Abattoir; Commonwealth—State Co-operation in Inspection staffing; Meat market; stock inspected; private abattoirs inspections; knackery inspections; saleyard inspections; city meat re-inspections; lamb branding; butcher shop inspections.	
Meat Inspection—Disease Conditions	43
Country Killing Section	43
Board of Tick Control	44
Queensland Border Control	45
Glenfield Veterinary Research Station	45
Veterinary Diagnostic Services	46
Veterinary Research—Cattle	46
Artificial insemination of dairy cattle; toxicity of B.H.C. for cattle; bovine tri- chomoniasis; leptospirosis; milk fever complex.	
Veterinary Research—Sheep	47
Mycotic dermatitis; ovine brucellosis; ovine pregnancy toxæmia; ovine hypocuprosis toxæmic jaundice.	
Veterinary Research—Poultry	48
Hexamitis of turkeys; mange in turkeys; avian monocytosis; pullorum disease.	
Miscellaneous, at Glenfield Veterinary Research Station	48
Rabbit Myxomatosis	48
Typing of Mycobacterium Cultures of Human Origin	48
Nutrition Research, Glenfield Laboratory	48
Protein content of Mature Native Grasses; Copper deficiency in cattle; sodium chloride metabolism in sheep; pellet feeding of sheep; drought feeding of sheep.	
Poultry Nutrition Research	49
Low protein wheat and bone meals for layers; high efficiency broiler diets; methionine supplementation; detergents and antibiotics in diets.	
Shannon Vale Nutrition Station.....	49
Trangie Agricultural Experiment Station and Wool Laboratory	49
Sheep Breeding experiments; co-operative grazing trial; wool metrology; fertility studies; "face cover" studies; early nutrition in relation to growth, size, wool yield, and fertility.	
Poultry Experiment Station, Seven Hills	50
Breeding improvement plan; recurrent reciprocal selections; back crossing.	
Nutrition Research (dairy cattle and pigs), at Wollongbar Experiment Farm	50
Beef Cattle, Horses and Goats Section	50
Beef growth rate studies; beef breeder competition; beef carcass competitions; goat studs (Saanen and Toggenburgs) at Condobolin Experiment Farm; extension services.	
Apiary Section	51
Bee diseases; Apiaries Act; bee research; importation of queen bees; summer school; extension services.	
Poultry Section	52
Breeding improvement plan; random sample testing; egg laying competitions; effi- ciency conference; chick sexing; agricultural extension grant demonstrations ("housing" and "free choice feeding"); extension services; schools.	
Piggery Section	52
Industry trends; Departmental studs; more emphasis on research; Swine Branding Act; extension services.	
Sheep and Wool Section	53
Industry trends; coastal sheep industry potentials; experimental projects at Depart- mental Farms and Stations; extension services.	

CONTENTS—*continued.*

	Page.
DIVISION OF DAIRYING	54
General	54
Regulatory Services	54
Dairy Industry Act (Dairy Produce Factories Advisory Committee; Appeal Board; Dairy Produce Factories and Stores; factory operatives certificates of competency; butter grading; choicest butter percentage; order of merit certificates to butter factories; milk and cream quality; margarine).	
Dairy Supervision Act; Pure Food Act; Factories and Shops Act	55
Herd Production Improvement Scheme	55
Herd recording; calf marking scheme; certified bull scheme; sire survey; herd wastage data; dairy bull loan scheme.	
Government Herds—Sire Survey and Progeny data	56
Artificial Stock Breeding	56
Extension Services	57
Production Improvement Project; development of dairying in Deniliquin district; visits to farms; country shows; special schools; war service land settlement farms; etc.	
Dairy Industry Extension Grant	58
Expenditure headings; dairy grant demonstrations; extension publications aided by the grant; displays, photographic and radio aids.	
DIVISION OF SCIENCE SERVICES	58
Biological Branch.	
Plant Pathology Section.	
New Plant Diseases.	
Cereal Diseases.	
Diseases of Other Field Crops.	
Diseases of Vegetable Crops.	
Citrus Diseases.	
Deciduous Fruit Diseases.	
Tropical Fruit Diseases.	
Berry Fruit Diseases.	
Diseases of Ornamentals.	
Nematology.	
Bacteriology Section.....	64
(Cheese starters; biological surveys of dairy factories and farm premises; nitrogen fixing bacteria; bee diseases).	
Entomological Branch	65
Incidence of Insect Pests—Summary.	
Field and Vegetable Crop Pests.	
Fruit Pests.	
Weed Pests.	
Stored Grain Pests.	
Timber Pests.	
Household Pests.	
Veterinary and Medical Pests.	
Entomological Collection—Naming of Groups, etc.	
Chemists' Branch	68
Cereal Section.	
Dairy Chemistry.	
Waters Section	
Minor Element and Plant Nutrition Section.	
Soil Survey Unit.	
M.I.A. Chemist.	
Pesticides Section.	
Stock Foods and Medicines Act.	
Committees.	
Botanists' Branch	72
National Herbarium.	
Botanic Gardens and Domain.	
Government House.	
Centennial Park.	
DIVISION OF MARKETING AND AGRICULTURAL ECONOMICS	75
State Marketing Bureau.	
Marketing Boards.	
Marketing of Primary Products Act.	
Wheat Industry Plebiscite.	
Market Reports and Statistics—daily, weekly, monthly services.	
Crop Reviews and Forecasts Service.	
Meteorological Adviser.	
Economics Research	76
Survey of adoption of improved practices by wheat farmers.	
Survey of land tenure on dairy farms, far north coast.	
Survey of beef cattle industry.	
Survey of cost structure of the dairy industry.	
Survey of grazing properties in Southern Region.	
Vegetable industry survey in the M.I.A.	
Farm classification by types, for State Statistician.	
Superphosphate—usage, and future demand.	
Other research projects.	
Advisory, Educational and Extension Services	77
Colombo Plan Students.	

CONTENTS—*continued.*

DIVISION OF INFORMATION AND EXTENSION SERVICES	Page. 77
Effect of Extension Grants.	
Enquiry Counter and Publications Distribution.	
Editing Section.	
Regional Publicity.	
Library Service.	
Display Artist/Designing Service.	
Photographic Aids Services—Cine and Still.	
Radio in Extension Service.	
Agricultural Bureau of New South Wales.	
Women's Extension Service.	
Rural Homemaker School.	
Extension Method Training.	
Rural Leadership Schools.	
REGIONAL EXTENSION SERVICES	80
Four Agricultural Regions; Shires and Holdings in the Regions; Field Personnel in the Regions; Regional office accommodation; Decentralisation within each Region; Regional Advisory Committees; Staff conferences; Regional publicity services; Activity highlights for the year in each Region.	
Southern Region—Activities.	
Far North Coast Region—Activities.	
Western Region—Activities.	
South Coast and Tablelands Region—Activities.	
M.I.A. AGRICULTURAL SERVICE	84
General	84
Irrigation Research and Extension Committee; Organiser's overseas tour; Farmer Co-operatives in extension; "Buildings for Climate" conference; Talks on home service; staff training; working with committees; agricultural engineer; Italian liaison officer; integration of Italian community.	
Extension Groups	85
Publications, Press and Radio in M.I.A. Extension	85
Projects	85
Extension programming; rice industry; concentrate spraying; weeds; irrigation by pumping from rivers; red scale campaign; quarantine; horticultural census; vegetable industry survey; farm woodlots.	
HAWKESBURY AGRICULTURAL COLLEGE	86
Student enrolment; Diploma examinations; Ex-student vocations; Extra-curricula; College Library; Student tours, visits; University Undergraduates' courses; Farmer Schools, Conferences, Field Days, etc; Changes in curriculum; buildings.	
Sectional Operations.....	87
College Farm; orchard; cannery and food technology; dairy produce factory; dairy research; poultry section; sheep and wool section; apiary; piggery; cattle breeding and management section; research agronomy.	
WAGGA AGRICULTURAL COLLEGE AND EXPERIMENT STATION	89
Student enrolment; Diploma examinations; Ex-student statistics; Student tours; Extra-curricula activities; Official Functions, Schools, Conferences, Field Days, etc; College Library; Works and Improvements.	
Sectional Operations.....	90
College Farm; Dairy Section; Piggery; Horse Section; Beef Cattle Section; Sheep Section; Poultry Section; Apiary; Orchard.	
AGRICULTURAL RESEARCH INSTITUTE, WAGGA	91
Wheat improvement; oat improvement; pasture species improvement; weed investigations; plant disease studies.	
APPENDICES—	
I Accounts of the New South Wales Department of Agriculture 1954-55	93
II Publications (1954-55) in Veterinary and Allied Research Fields	103

AS AT 30th JUNE, 1955

DEPARTMENT OF AGRICULTURE

Minister for Agriculture and Minister for Food Production	Hon. E. H. GRAHAM, M.L.A.
Acting Minister (during the overseas absence of the Hon. E. H. Graham)	Hon. R. B. NOTT, M.L.A.
Under Secretary and Director	Dr. R. J. NOBLE.
Assistant Under Secretary	Mr. E. O. TOUT.
Assistant Director of Agriculture	Dr. H. J. HYNES.

Central Administration—

Accountant	F. L. HEDGES.
Chief Clerk	J. I. MARROTT.
Personnel Officer	C. W. WEARNE.
Pastures Protection Officer	S. W. WISE.
Legal Officer	J. L. HAGER.
Architect	H. A. BROWNE.
Supervisor, Experiment Stations and Farms	L. T. JUDD.
Executive Officer, Co-ordinated Extension Services	L. J. GREEN.

Regional Supervisors of Agriculture—

Southern Region	R. C. MADSEN.
Far North Coast Region	S. R. BALLARD.
Western Region.....	B. D. AMENT.
South Coast and Tablelands	R. W. SHELLEY.

Division of Plant Industry—

Chief	W. H. G. POGGENDORFF.
Deputy Chief	A. PEARSON.
Principal Agronomist (Pastures)	C. K. VEARS.
Principal Agronomist (Research)	Dr. S. L. MACINDOE.
Acting Principal Agronomist (Extension)	G. NICHOLSON.

Division of Horticulture—

Chief	H. BROADFOOT.
Deputy Chief	H. W. EASTWOOD.
Principal Fruit Officer (Viticulture)	H. L. MANUEL.
Principal Fruit Officer (Extension)	J. A. BALLANTYNE.
Principal Fruit Officer (Research)	Dr. F. T. BOWMAN.
Senior Inspector (Export and Import Branch)	L. T. BILBE.

Division of Animal Industry—

Chief	C. C. BLUMER.
Emergency Chief	Dr. H. G. BELSCHNER.
Deputy Chief	R. M. WATTS.
Director of Veterinary Research	G. EDGAR.
Chairman, Board of Tick Control, Lismore	J. N. HENRY.
Principal Veterinary Officer	N. K. GOLDING.
Principal Livestock Officer (Sheep and Wool)	A. K. CANTRILL.
Principal Livestock Officer (Horses, Cattle and Goats)	W. J. B. MURPHY.
Principal Livestock Officer (Pigs)	G. M. D. CARSE.
Principal Livestock Officer (Poultry).....	V. H. M. BRANN.
Principal Livestock Officer (Apiculture)	A. A. CLEMSON.

Division of Dairying—

Chief	G. MCGILLIVRAY.
Deputy Chief	A. C. SMALL.
Principal Dairy Officer.....	J. D. L. MCGIBBON.
Principal Dairy Officer (Herd Improvement)	I. W. SCOTT.

Division of Science Services—

Chief	Dr. R. J. NOBLE.
Chief Biologist	Dr. C. J. P. MAGEE.
Chief Entomologist	S. L. ALLMAN.
Chief Chemist	T. H. JOHNS.
Chief Botanist and Curator, Botanic Gardens and National Herbarium	R. H. ANDERSON.

As at 30th June, 1955
Department of Agriculture—*continued*.

Division of Information and Extension Services—

Chief	H. PARRY BROWN.
Editor of Publications	R. J. K. SYNNOTT.
Organiser, Agricultural Bureau	J. J. SLATER.
Senior Extension Officer (Women's Service)	Miss N. M. FOSKETT.

Division of Marketing and Agricultural Economics—

Chief	C. J. KING.
Principal Economics Research Officer	P. C. DRUCE.

Hawkesbury Agricultural College—

Principal	H. R. RICHARDSON.
Deputy Principal	A. JOHNSON.

Wagga Agricultural College and Experiment Station—

Principal	B. DOMAN.
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Wagga Agricultural Research Institute—

Director	Dr. A. T. PUGSLEY.
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Experiment Farms and Stations—

Bathurst Experiment Farm	Manager	J. A. HOLBECHE.
Condobolin Experiment Farm	Manager	H. A. W. WOODWARD.
Cowra Experiment Farm	Manager	W. R. WATKINS.
Glenfield Veterinary Research Station	Director	G. EDGAR.
Gosford Citrus Experiment Station	Officer-in-Charge	L. F. MANDELSON.
Grafton Experiment Station	Manager	C. E. COLLINS.
Griffith Viticultural Nursery	Superintendent	A. C. CLIFTON.
Leeton Experiment Farm	Manager	G. A. CRAWFORD.
New England Experiment Farm ..	Manager	E. C. POWELL.
Poultry Experiment Station, Seven Hills	Manager	D. C. DUNCAN.
Tamworth Agricultural Experiment Station	Officer-in-charge	J. A. LOVERIDGE.
Temora Experiment Farm	Manager	R. A. WILLIAMSON.
Trangie Agricultural Experiment Station	Manager (Acting)	E. G. CUTHBERTSON.
Wollongbar Experiment Farm	Manager	G. GILES.
Yanco Experiment Farm.....	Manager	B. O. FRENCH.

Murrumbidgee Irrigation Area Agricultural Service—

Agricultural Organiser	D. V. WALTERS.
Biometrician	F. C. McCLEERY.

* For details of staff of the various Divisions and Branches see New South Wales Department of Agriculture brochure "Directory of Officers".

1955

NEW SOUTH WALES

DEPARTMENT OF AGRICULTURE

Report of the Under Secretary and Director to the Minister for Agriculture and Food Production for the Year Ended 30th June, 1955

Department of Agriculture,
Sydney, 26th August, 1955.

Dear Sir,

Herewith my Report of the Department of Agriculture for the year ended 30th June, 1955.

Production Trends.

Apart from rice, eggs and butter, the State's primary production showed little increase on that of 1953-54. This was almost entirely due to a prolonged dry spell throughout the autumn and winter of 1954 in most inland areas, and later extensive floodings, on several occasions, in various districts. The unfavourable weather range caused, in particular, marked decline in output of wheat, oats and maize.

The very dry spell, which had started in the autumn of 1954 over much of the State, was not broken until very general rains occurred in mid-spring. The north coast had experienced better seasonal conditions until July but then excessive rain led to severe floodings in the Tweed, Richmond and Clarence Valleys.

Widespread rains in mid-spring, 1954, completely changed, for the better, production prospects throughout the State. Then abnormally heavy rains during late February and early March, 1955, caused the worst floods on record in the lower Hunter Valley and in western rivers from the Bogan to the Queensland border.

Stock losses and damage to properties were severe. Subsequently, the State experienced further, above average rainfall and, early in May, more floodings occurred in northern and central coastal districts. However, at the 30th June, 1955, New South Wales faced the best seasonal prospects for some years.

Wheat acreage sown in 1954 was somewhat less than the 1953 acreage but production from the crop was considerably less. Only the mid-spring rains saved the crop from complete failure.

The area sown to wheat in 1955 is estimated to be about the same as that of 1954. At the end of June, 1955, seasonal conditions for wheat and the crop prospects were excellent.

The 1954-55 production of other cereals, apart from rice, showed some decline. The rice crop was substantially higher than in any past season, from an acreage about equal to that of the previous year. The oat season resulted in lower grain production than in the previous year, and much of the crop was used as green fodder. Sowings for the 1955 season are expected to be slightly greater than those of the 1954 season. Prospects at the end of the twelve months were very good. Maize production was also lower than in 1953-54, mainly because the floods in coastal districts destroyed or severely damaged all Hunter Valley and most north coast crops.

The area sown to improved pastures continued to expand, at a rate similar to that of the previous year. This expansion, particularly marked on the tablelands and slopes, is one of the striking developments of recent years in this State's rural industry.

Sheep numbers were maintained. Influenced by relative profits, there was still some trend away from crossbreds to merinos.

Butter production showed a marked increase over that of 1953-54 despite flood damage in central and northern coastal areas.

Production of other livestock commodities showed little variation. Output of beef and veal, pigmeats, mutton and lamb was steady. Egg production increased. Cheese production declined.

The supply of farm machinery further improved and the position is generally satisfactory, although a few machines of particular makes continued in short supply.

Although production of general farm materials increased, demand was still far in excess of supply. The extensive flood damage increased the demand, and further strained the supplies. Steel fencing posts remained in very short supply throughout the year, and many areas experienced also shortages of fencing wires, galvanised iron, and galvanised piping.

Supplies of most protein feeds were insufficient for the first nine months of the year.

Superphosphate shortage, relative to the greatly increased demand, is hindering the potential full rate of development of the State's rural industries, but greater supply is expected in the coming year. One of the major manufacturers of superphosphate has a considerably greater plant capacity than formerly.

Food Production Policy.

The State co-operated actively with the governments of the Commonwealth and the other States through the Australian Agricultural Council and the Standing Committee on Agriculture, to promote further, selective expansion in food and fibre production. Particular attention has been paid to the encouragement of low cost production and increased efficiency in the rural industries.

The production potential has been further expanded by sustained developmental work on holdings throughout the State. As already indicated there has been further, marked expansion in the total area sown to improved pastures. The development has occurred despite continued shortage of superphosphate and other aids, particularly fencing requisites.

Concessional depreciation allowances exclusive to the rural community, and which are to continue in 1955-56, again encouraged farm development. With the relatively high level of income taxation and a reasonably satisfactory level of incomes in most of the rural industries, the depreciation allowances have influenced land holders, particularly graziers, to invest substantial sums in development of their properties.

The market outlook for most of the State's major rural commodities contained no surprises; although an estimated 11 per cent. reduction occurred in wool prices. Export sales of wheat were higher than in the previous year, and prices were slightly better, but an abnormally large carryover of wheat at the end of the present season is anticipated. Temporary difficulties were experienced early in 1955 with the sale of meat to the United Kingdom but the outlook for beef, mutton and lamb remains good and prices are reasonably satisfactory. The market outlook for dairy products was not so favourable, and difficulties were again experienced in disposing of the output of some of the lesser rural commodities including eggs, pigmeats, processed milk products and dried vine fruits. At present it is not desirable to encourage further expansion of these industries, except in so far as is necessary to supply the increasing demands of the local market.

Australian Agricultural Council and Standing Committee on Agriculture.

The Australian Agricultural Council met in Canberra, July, 1954 and in Melbourne, December, 1954. Two associated meetings of the Standing Committee were held. The Standing Committee visited also Papua and New Guinea.

Foot and Mouth disease of livestock was one of the many matters considered. This disease is potentially of great importance to Australia. The possibility of its introduction from overseas, with consequent heavy stock losses, cannot be disregarded.

The Agricultural Council adopted a resolution from the Standing Committee that the Commonwealth, and the States collectively, each contribute 50 per cent. of the total cost of eradication should the disease occur in Australia.

Food and Agriculture Organisation.

The State F.A.O. Committee maintained close liaison with the National F.A.O. Committee and, through that Committee, with headquarters of the United Nations Food and Agricultural Organisation in Rome. The State Committee and the Department continued to support F.A.O.'s Expanded Programme of Technical Assistance to under-developed countries. Several Departmental and retired Departmental officers were active participants in the programme this year. The Department also assisted in training agricultural students and government officers from Asiatic countries.

Wheat Stabilisation.

Following a July, 1954 conference attended by the Prime Minister, the Minister for Commerce and Agriculture, and the Premiers and Agriculture Ministers of all States, agreement was reached on the terms of a wheat stabilisation plan to cover the five seasons 1953-54 to 1957-58, inclusive. Ballots were then conducted in all wheat-growing States to ascertain whether the plan was acceptable to wheat growers. The voting in all States was very much in favour of acceptance. In New South Wales 14,110 growers voted in favour whereas only 914 voted against it.

The plan, now operating, is similar in principle to the 1948 Stabilisation Scheme, although it differs in some minor respects. As in the past, for the period of the plan the Australian Wheat Board is the sole marketing authority for wheat within Australia and wheat and flour for export from Australia.

The Commonwealth Government has guaranteed to growers a return equal to the ascertained cost of production, in respect of up to 100,000,000 bushels of wheat exported from Australia in each of the five years; and the States have undertaken to fix a minimum price for wheat sold locally. In no circumstances will this local price be reduced below the ascertained cost of production as determined each season. Moreover, unless the International Wheat Agreement price or, in the absence of an International Wheat Agreement, the export price at the beginning of the season falls below 14s. 0d. per bushel, bulk basis, f.o.r. ports, the local price will not be reduced below this figure. The local price for the 1954-55 season was fixed at 14s. 0d. per bushel, bulk basis.

The plan also provides a stabilisation fund, financed by an export tax of 1s. 6d. per bushel on all wheat exported. This fund will not be allowed to exceed £20,000,000.

The Wheat Stabilisation Plan is implemented under Commonwealth legislation supported by complementary legislation in all States. Wheatgrowers are now assured of reasonable price stability at least until the end of the 1957-58 season.

Expenditure.

The net expenditure from Consolidated Revenue Fund on investigational, educational and associated administrative activities amounted to £1,355,139. This figure does not include the expenditure of £718,356 on tick eradication and control (£468,356 provided by the State and £250,000 contributed by the Commonwealth), the administration of the Government Grain Elevators, £285,916 gross (revenue £924,923), nor the Botanic Gardens, Domain and Centennial Park, £119,750 gross (receipts £9,229).

Certain revenues collected by the Department and amounting to £494,357, exclusive of the revenue and receipts of the undertakings mentioned in the preceding paragraph, have been deducted from the gross expenditure to arrive at the net £1,355,139.

In addition, the Departmental expenditure from Loan Funds was £167,626.

Details of the accounts of the Department, including numerous Special Deposits Accounts, opened with the Treasury in terms of the Special Deposits Act of 1911, are presented in the *Appendix I*.

Capital Works.

The Department has in hand capital works such as buildings, water supply, sheep- and stock-yards, etc., which are estimated to cost £175,000 to complete in 1955-56. In addition to the works in hand, there is a large number of improvements required at the Experiment Stations, in the nature of buildings, water supply, fencing, etc. These are essential if the Department is to execute the research work necessary to the well being and development of the primary industries, and of the educational institutions of the Department.

Flood Relief.

The disastrous February floods which affected many parts of the State resulted in 921 applications by primary producers for flood relief. These claims were investigated by field officers of the Department. The Department has paid 7,535 claims made by householders and 596 accounts for food, clothing, medical supplies and transport. Expenditure from all sources on flood relief amounted to £1,051,094.

Gift Fodder Appeal—Flood Relief.

An appeal was launched by the Hon. the Premier on Monday, February 28th, 1955, for gift fodder for distribution in flood stricken areas. This appeal met with a very ready response from primary producers, inter- and intra-State. The quantity which crossed the border at Albury from Victoria totalled almost 5,000 tons and fodder from Victoria also came through Tocumwal.

It was estimated that donated fodder exceeded 8,000 tons. The major distribution was in the Hunter Valley.

At a stage the quantity passing through the Honeysuckle Station, Newcastle, was so great that army services had to be called in to assist in achieving a quick turn-round of rail trucks. Volunteer labour was readily forthcoming in most places. The Department of Railways performed an excellent service in the emergency which arose.

From launching to final closure the appeal lasted for one month.

Stock Buying Delegation.

A Stud Stock Delegation led by the Hon. E. H. Graham, M.L.A., Minister for Agriculture and Food Production, and including Messrs. G. McGillivray, Chief of the Division of Dairying and W. J. B. Murphy, Principal Livestock Officer (Horses, Beef Cattle and Goats), proceeded overseas in May, 1955, with the object of purchasing fresh lines of stock for use in Departmental herds. The Delegation aims to purchase dairy cattle, beef cattle and an Arab stallion.

The Department of Agriculture has been a consistent importer of stud stock since the turn of the century, with a view to raising the quality of the State's herds in general. The 1955 delegation represents a continuance of this policy.

Farrer Memorial Trust.

The Farrer Memorial Trustees Research Scholarship Fund held an Annual and three ordinary meetings.

The Annual Farrer Memorial Oration was given by Dr. A. R. Callaghan, C.M.G., D.Ph., B.Sc., (Oxon), B.Sc. Agr. (Sydney) and Director of Agriculture in South Australia. Dr. Callaghan was formerly a New South Wales Department of Agriculture plant breeder from which position he resigned to accept appointment as Principal, Roseworthy Agricultural College, South Australia.

The Oration was delivered on the 13th July, 1954 at the Annual State Congress of the Agricultural Bureau of N.S.W. at the Hawkesbury Agricultural College. The subject was "Quality of the Australian 'Wheat Crop'", and the text was subsequently published in the *Agricultural Gazette of N.S.W.*

Dr. Callaghan was presented with the Farrer Memorial Medal for 1954, in recognition of his distinguished service in agricultural science.

A further Farrer Scholarship Award has been made. The recipient is Mr. M. V. Single, a plant breeder of the New South Wales Department of Agriculture. He will undertake advanced studies in the United Kingdom. Mr. Single's special interest for the past two years has been research into frost damage in wheat.

Botanic Gardens and Sydney Domain Trust.

The Trustees of the Botanic Gardens and Domain met on two occasions.

Requests continued to be received for the temporary or permanent alienation of portions of the Domain for purposes other than those relating to the full and free use of the Domain by the public. The Trustees pursued their constant policy of preserving the area for the purposes for which it was originally dedicated. An application by the City Council for the construction of a Car Parking Station at the south-east corner of the Domain is under consideration.

The By-laws of the Domain were amended during the year to permit the sale of literature in the Domain.

A proposal for development of a suitable area in the suburbs of Sydney as part of the Botanic Gardens is being considered.

The Trustees have agreed to the transfer of the lease of the Botanic Gardens Refreshment Room to a new lessee.

McGarvie Smith Institute.

An increasing range of vaccines is produced at the McGarvie Smith Institute. Many of the vaccines are now sold also for use overseas.

In accordance with the McGarvie Smith Institute Incorporation Act, 1928, profits from the sale of vaccines are applied to the promotion and advancement of veterinary education and research.

The financial position of the Institute is satisfactory.

Agricultural Regions.

Another Region was established, known as the South Coast and Tablelands Region, with headquarters at Goulburn. The establishment date was 14th April, 1955. This is in continuation of the policy of decentralised administration and direction of extension and regulatory services. The earlier founded Regions were Far North Coast, headquarters at Lismore; Western Region, headquarters at Orange; and Southern Region, headquarters at Wagga.

The value of the Regional system of administration was illustrated in a time of crisis during the disastrous floods of February, 1955, in the Western Region. The Regional Supervisor and staff were able, on emergency notice, to take concerted action to afford assistance where it was most required

at any stage. For instance, advice was received from Dubbo that stock were in dire need of fodder. Calls for donations of fodder and transport assistance were made by regional staff over local radio stations, and the results were collated at headquarters, Orange. Within six hours of the appeal being launched, fodder was on the move to Dubbo, by road. Within three days 300 tons of fodder had been conveyed there and accommodated. Fodder in excess of the Dubbo requirements was despatched by rail to Newcastle for northern, flood affected farms.

Yet another striking instance of regional organisation was the Western Region's fodder air-lift when vast areas of grazing land in the west were inundated with water and thousands of sheep and cattle were marooned and likely to die of starvation.

During eleven days from 2nd to 12th March, seventy-five flights by R.A.A.F. planes were organised. Twenty of the flights were for reconnaissance and fifty-five to drop fodder. On each flight an officer of the Department of Agriculture acted as an observer and adviser to the pilot. Some 4,182 bales of fodder were dropped, and the action is known to have saved thousands of sheep and cattle. Much of the credit must be given to the excellent co-operation of R.A.A.F. staff with Department of Agriculture officers, enabling the latter to exploit their ground knowledge of the districts, and of fodder requirements of stock.

More detail of the Regional Services is provided later in this Report.

Co-ordinated Extension Services.

The Co-ordinated Extension Services scheme embraces field officers of the Department of Agriculture, the Soil Conservation Service, the Rural Bank and the Milk Board. It continued to provide a co-operative advisory service to primary producers.

Reports from the district agronomists, the local co-ordinators, indicate the value of the co-ordinated scheme to the officers of each department and institution concerned, as well as to the farmers. One co-ordinator reports, for his district, that the co-operative advisory service "is mainly responsible for the greater interest taken by landholders in pasture improvement, and the record area established during the past eighteen months".

Some 220 field personnel, agronomists, livestock officers, fruit officers, dairy officers, field assistants, Rural Bank valuers, soil conservationists, and Milk Board advisers—are drawn into the Co-ordinated Extension Services scheme.



Serrated Tussock Control.

Twenty-four demonstrations were established to show the role of tillage, pasture sowings and management in serrated tussock control.

(Photo from Goulburn Office).

Agricultural Extension Grant.

This Grant, by which the Commonwealth Government makes available to New South Wales £50,000 per annum, and which commenced in 1952, was continued. Advice has been received from the Commonwealth that it will continue until 1960, and that for New South Wales the amount of the Grant has been increased to £75,000 per annum; to finance a concerted drive to assist the poultry industry to increase egg production per bird, and thereby decrease the cost of egg production.

Many types of projects, covering pasture establishment and management; pasture seed production; irrigation; potato, peanut, rice and pea growing; feeding of pigs; egg production; horticulture; weed control; films, photography and radio in extension service; special publications; provision of field assistants, and transport; and regional publicity officers to assist field officers' use of mass and group media, were in operation this year.

One of the projects most valuable to extension service, has been that concerned with provision of extension aid equipment at field offices. These aids include cameras, public address systems, cine film projectors, film strip and slide projectors, desk slide-viewers, pocket slide-viewers, and tape recorders.

The publicity officers stationed at headquarters of Agricultural Regions have organised extension publicity programmes through radio stations and country press, with striking effects on the tempo of field officers' extension service. An example of this from one Agricultural Region is that during the past twelve months 399 talks by Department of Agriculture officers were broadcast over radio stations in the Region, and regular copy was supplied to thirty-nine newspapers, many of which devoted a weekly column to regional agricultural news and advice.

Country Killing.

The Dubbo Abattoir, the third of the series of four large-scale killing works to be constructed under the Country Killing programme, commenced operations on 25th August, 1954. The designed killing capacity of this Abattoir is 7,500 sheep and lambs, 600 cattle and 300 pigs per week.

Gunnedah Abattoir construction is proceeding satisfactorily. This Abattoir is expected to commence operations during 1957.

Stock slaughtered at the Goulburn and Wagga Abattoirs were again in excess of those for the previous year. Weekly killing figures at the Goulburn Abattoir have reached 8,411 in the case of sheep and 891 for cattle.

Lamb Branding.

Regulations were proclaimed bringing the branding of lamb into effect in respect of Kearsley Shire, Municipality of Cessnock, City of Blue Mountains, and Municipality of Dubbo.

Meat Inspection Service.

The Meat Inspection Service fulfilled under difficulties its main function, inspections to ensure a disease-free supply of meat for the Sydney Metropolitan Area. The continued shortage of meat inspectors was the main difficulty, emphasised by an increase in the number of stock slaughtered. Details in these respects are provided later in this Report.

A trial co-operative scheme as between Commonwealth and State was commenced at the State Abattoir, Homebush, in February, 1955, and is continuing. It provides for a reduction of inspection staff, Commonwealth and State, by ten men each; the deficiency to be countered by mutual assistance.

Wheat Handling.

As from 1st March, 1955, control of the Grain Elevators has been vested in the Grain Elevators Board of N.S.W. and, under the Act by which the Board was constituted, a report will be made to Parliament by the Board at the end of the Board's financial year. The customary statistical detail is therefore not included in this Department's report for 1954-55.

In summary, however, wheat delivered in 1954-55 was seriously affected by heavy rain which fell immediately prior to and during the harvesting period. The northern and western districts were affected more seriously than were other parts of the State.

The quantities handled *in bulk*, 24,673,412 bushels, represented 85.2 per cent. of the total delivered to the Elevators by wheatgrowers. Because of adverse weather, 1,987,616 bushels were accepted as "shot and sprung"; the balance was taken in as F.A.Q.

The sub-terminals at Junee, Parkes, Werri Creek and Temora were all used for receipt of wheat by rail and wheat was received also from road vehicles at the Parkes and Werri Creek sub-terminals.

There will again be a heavy carry over of wheat in the Elevator System at the beginning of the 1955-56 harvest, but the new storage units mentioned in the Annual Report for 1953-54, with an additional capacity of 11,900,000 bushels, will be ready. They will be of great assistance in the handling of the new crop.

When all construction work now in progress has been completed, the Elevator System will have a total storage capacity of over 70,000,000 bushels.

Cattle Tick Eradication.

Special attention has been paid to the preparation of those Tick Quarantine Areas west of the Richmond Range and Kyogle, for the eradication campaign to commence in January, 1956. For the preparatory work it has been necessary to draw on staff from the Richmond Quarantine Area. Consequently, the policy treatments adopted in the Areas east of the Richmond Range with the exception of the Tweed Quarantine Area, have been considerably curtailed. That, however, is an essential investment for success of the forthcoming eradication campaign.

Measures have been taken to prevent the spread of cattle tick to "clean country", by revising the treatments required. It is now essential for the final treatment to be in a chlorinated hydro carbon dip, in view of the spread of arsenic resistant ticks to further sections of the Quarantine Areas. There has been no relaxation in respect of measures to keep the tick within the present Tick Quarantine Areas. Special attention has been given to holdings adjoining "clean country".

Arsenic resistant ticks have spread further in the Tweed and Kyogle Quarantine Areas, and are now also present in the Bonalbo and Richmond Quarantine Areas. Dips have been charged with chlorinated hydro carbons to deal with the development.

Tick Fever outbreaks have occurred in areas outside the Tweed, one at Green Forest in the Richmond Quarantine Area and one at Dairy Flat in the Kyogle Quarantine Area. The losses have been very light, however, because of treatment activities in the affected herds.

During an inspection of cattle in "clean country", two tick infestations were detected at Cullendore near the N.S.W.-Queensland border. To deal with this development a new Quarantine Area has been gazetted, the Boonoo Boonoo Quarantine Area.

War Service Land Settlement.

During the latter half of the year, a noticeable increase occurred in promotion of new estates for War Service Land Settlement.

Following recent agreement between the Commonwealth and State Governments whereby a special loan will be available to New South Wales, a continued marked increase in this activity is expected.

State Fodder Conservation Scheme.

Advances under the State Fodder Conservation Scheme were made to eighty-one farms and totalled more than £40,000.

Landholders generally, however, have given very limited attention to conservation of fodder during the past eight years of good seasons. In consequence the stored reserves against a period of need are relatively inconsiderable.

Every opportunity is taken to encourage farmers to conserve fodder. Further encouragement is offered by the improvement of machinery for the purpose, and by the demonstrated farm storage of feed grain in galvanised silos.

Agricultural Research Institute.

The Agricultural Research Institute, Wagga, was officially opened by the Hon. E. H. Graham, M.L.A., Minister for Agriculture and Food Production, on 30th October, 1954.

In the initial stages, research studies are centred on problems associated with the wheat industry in southern New South Wales, with special reference to quality improvement of wheat grain, skeleton weed control, soil fertility, crop and pasture improvements, and wheat disease problems.

Research programmes have been initiated in a number of these fields.

Research Extension Committee.

The Research Extension Committee, Dr. R. J. Noble, Under-Secretary and Director, Department of Agriculture (Chairman); Professor J. R. A. McMillan, Dean, Faculty of Agriculture, University of Sydney; and Dr. H. J. Hynes, Assistant Director, Department of Agriculture; met on a number of occasions to review research and extension activities affecting the Department and the University Faculty of Agriculture.

Committee for Co-ordination of Agriculture Research.

The Advisory Committee on Co-ordination of Agricultural Research, for which the Chairman of the Public Service Board is Chairman, held one meeting. The main subject of discussion was additional staff for the Hydraulic Branch of the W.C. & I.C.

M.I.A. Agricultural Service.

This Service has continued to function actively. The Agricultural Organiser, Mr. D. V. Walters, concluded his secondment to the Department on the 30th June, 1955, and returned to the C.S.I.R.O.

Foot and Mouth Disease Conference.

A conference was convened, attended by senior officers of the Division of Animal Industry, with observers from the Division of Veterinary Hygiene, Department of Health, Canberra, and the Queensland Department of Agriculture and Stock, and

representatives of the N.S.W. Treasury, N.S.W. Government Stores and Police Department. Actions to be taken in the event of an outbreak of foot and mouth disease were thoroughly discussed. The veterinary officers were required each to furnish, as a set exercise, an action plan. The products of that exercise were the basis of the conference discussions.

Myxomatosis.

The effect of myxomatosis is that New South Wales is carrying a smaller rabbit population than at any other period in this century. Part of the evidence is in the tonnage of rabbit skins offered at auction in Sydney for the first six months of 1955, amounting to 122 tons, a 57 per cent. reduction on the comparable period of 1954, and a 94 per cent. reduction on average tonnage sold during the first six months of each of the eight years prior to the release of myxomatosis.

Manufacturers using rabbit fur, notably furriers and felt hat manufacturers, are paying very high prices for skins at auction.

There should be a substantial lift in the weight of wool produced per head of sheep over the next wool selling season.

Demand from stock owners for the virus has been remarkably steady in spite of the reduced rabbit population. Some 280,000 doses were supplied by the Department's Veterinary Research Station, Glenfield; slightly in excess of the 1953-54 distribution.



Speeding Selections.

Research glasshouses have been added to several of the Department's Field Institutions.

At the Agricultural Research Institute, Wagga, several generations of wheat are grown in one year, speeding selections in the breeding programmes.

(Photo from Wagga Office.)

Tuberculosis Survey.

The project of typing of *Mycobacterium* cultures of human origin by Dr. H. R. Seddon at Glenfield Veterinary Research Station was completed. Approximately 1,000 strains of *M. tuberculosis* from human cases have been typed.

Examination during the preceding year had shown all cultures supplied from human patients to contain tubercle bacilli of human type and it was felt that perhaps the bovine type were being missed—being more difficult to culture. Arrangements were made in July, 1954, for material suspected of containing tubercle bacilli to be forwarded to Glenfield for examination. Only specimens from country hospitals, or from metropolitan hospitals in the cases of selected patients presumed to have been infected in the country, were sought. It was considered that bovine infections would be more likely to be contracted in non-metropolitan areas, where milk is not pasteurised. Material from children in particular was sought.

The response was much less than hoped. Only eighty-eight such specimens were received. Much of the material showed no tubercle bacilli, and in all cases where they were found they proved to be the human type.

Examination of cultures isolated at country hospitals also continued. These too were all of the human type.

Poultry Improvement Plan.

The Poultry Advisory Board completed a breeding improvement plan which has been approved by the Minister and is now in the early stages of operation. Poultry farmers who join the scheme must also be listed in the Pullorum Tested Flock Scheme.

This Poultry Improvement Plan (Eggs) is the first attempt in New South Wales to give accreditation to producers who wish to breed for higher production. The scheme will be implemented by district livestock officers.

Poultry Efficiency Conference.

The principal livestock officer (poultry) attended the conference of Commonwealth and State poultry officers held at Perth in November, 1954, to recommend means of promoting higher efficiency in the poultry industry. The report of the conference was adopted by the Australian Agricultural Council. Livestock officers of the Department assisted officers of the Commonwealth Bureau of Agricultural Economics in an economic survey of a sampling of commercial egg producers.

Apprenticeship Scheme for Dairy Produce Factories.

One of the essentials in the dairying industry is to produce high quality dairy products for both local and overseas sales. That requires highly trained technicians.

In recent years there has been insufficient trend towards employment in the manufacturing side of the dairying industry and it is generally recognised that some inducement is needed to attract suitable trainees. This may now be achieved through co-operation between the dairying industry, the Chamber of Manufacturers, the industrial union concerned, banking institutions, and the Department of Agriculture.

An apprenticeship scheme has now been devised and approved, embracing a scholarship phase whereby suitable apprentices will take the diploma course in dairying at Hawkesbury Agricultural College and during that college period of training be paid £300 per annum to meet College fees and current expenses.

Money sufficient for several such scholarships per annum will be provided collectively by banking institutions, the dairying industry, machinery and chemical manufacturers, and present indications are that the funds will carry the scheme for at least ten years.

Experiment Farms and Stations Branch.

At Wagga Agricultural College and Experiment Station the major undertaking has been new administrative and living quarters. These are being erected at a cost exceeding £160,000. Foundation stock for a Polled Shorthorn beef stud has been purchased and further stock is to be imported for the Wagga Station.

Coomella Horticultural Research Station has undergone considerable development. The boundary fencing has been completed for part of the Station and the provision of irrigation water for that section is in hand. Division of Horticulture will be able almost immediately to inaugurate part of the Coomealla research programme.

For the Tropical Fruit Research Station at Alstonville fencing materials are now on hand. Possession of the property is anticipated to occur in October, 1955.

At Trangie Agricultural Experiment Station the recent floods washed away or seriously damaged approximately 20 miles of boundary and subdivision fencing, and flood waters caused heavy loss of fodder reserves. The additional expense caused by these losses was met from the Department's Consolidated Revenue Funds Appropriation and strained those resources. Despite difficulties, fencing materials were obtained, and the damage was repaired expeditiously. Research activities were able to proceed again within a very short period.

At Bathurst, Grafton, Yanco and New England Experiment Farms, glasshouses have been erected and will give a great impetus to plant breeding and other agronomy research.

Tamworth Agricultural Experiment Station has been provided with machinery sheds. Considerable progress has been made in respect of soil conservation, and fencing.

Lack of sufficient funds is handicapping the development of experiment stations. Nevertheless, attention has been given to each station, and their research activity has expanded during the past twelve months.

Legal and Registration Branch.

Legislation.

The following Acts were enacted:—

Grain Elevators Act, 1954.—This provides for a Grain Elevators Board comprising a full-time chairman, a railways representative, a treasury representative and two grower representatives, to take over the control and administration of the Government grain elevator system and to be responsible for the handling of the New South Wales wheat crop. All the terminals, silos, buildings and other assets comprising the grain elevator system are vested in the Board for which a capital indebtedness to the Government is declared and the Board is charged with the repayment thereof. The Board operates as an independent commercial undertaking deriving its revenue from storage charges. The Act commenced on 1st March, 1955.

Wheat Industry Stabilisation Act, 1954.—Following agreement between the States and the Commonwealth on a stabilisation plan to operate for a further period of five years, this Act was passed in conjunction with similar legislation in the other States and the Commonwealth to replace the Wheat Marketing Act, 1948-1953, which merely provided for the orderly marketing of wheat through the Australian Wheat Board. The Act incorporated the provisions of the Marketing Act relating to the home consumption price for wheat and provided for the imposition of a maximum export charge of 1s. 6d. per bushel to finance the Stabilisation Fund. The stabilisation plan guarantees to the producer during the period of its operation at least cost of production for all wheat produced.

Noxious Insects (Amendment) Act, 1954.—The Noxious Insects Act, 1934, was amended to place specific obligations upon pastures protection boards to co-operate with the Department in campaigns for the destruction of grasshoppers. Also the Minister and the boards have been given power to enter properties to destroy grasshoppers and to charge the cost to the landholder. The maximum amount of the rate which boards can be required to levy to reimburse the Noxious Insects Destruction Fund has been increased to 3d. per head of large stock and ½d. per head of sheep.

Wine Adulteration Repeal Act, 1955.—The Wine Adulteration Act was repealed so that provision could be made in regulations under the Pure Food Act for standards of quality and purity in respect of wine.

Pastures Protection (Amendment) Act, 1955.—This was mainly a machinery measure but provision was made for dingo destruction boards to obtain greater revenue from component pastures protection boards; maximum pastures protection rates which boards could levy were increased, and further provision was made in regard to fencing of private properties from travelling stock reserves.

Swine Branding Act, 1940.—This Act was brought into operation on 1st February, 1955. The Act prohibits the sale of pigs or delivery of pigs for slaughter unless branded with a brand registered under the Act in the name of the owner.

Regulations, Proclamations, etc.

Forty-five proclamations, thirty-one regulations and seventy-five notifications were published in the *Government Gazette* to implement Acts administered by the Department. This was

in each case double the number issued in the previous year, and may indicate a trend to wider use of Acts in the administration of the Department.

The only set of new Regulations was for the implementation of the Swine Branding Act.

Notable amendments, from point of view of policy, were—
the decontrol of distribution of literature in the Domain;
the banning of the consumption of alcohol in Centennial Park;

variation of ripening fees chargeable by farm produce agents; and

variation of standards of poultry foods.

Prosecutions.

Informations for prosecution of offences under the various Acts of the Department numbered 124, eight more than in 1953-54. The prosecutions covered the more common offences under the Plant Diseases Act and Stock Diseases Act, and also offences under the Stock Foods and Medicines Act, Meat Industry Act and Agricultural Seeds Act.

A prosecution of a company for the manufacture of table margarine without being the holder of a licence, in breach of the Dairy Industry Act, came before the High Court on the question of whether the validity of the Act was affected by section 92 of the Commonwealth Constitution. The High Court unanimously upheld the validity of the Act and an application for leave to appeal to the Privy Council is pending.

A prosecution of a farm produce agent to test the validity of the Farm Produce Agents Act so far as it fixed commission on the sale of interstate produce also came before the High Court on the same question and in this case also the Court unanimously upheld the validity of the Act.

Arbitration under the Agricultural Holdings Act, 1941.

Awards were made in six disputes referred to arbitration; four on the question of whether the tenant was cultivating according to the rules of good husbandry, and two involving payment of compensation to the tenant. One was in respect of fixtures which the owner had elected to purchase rather than have them removed from the holding. It was the first occasion on which a dispute of this kind has been referred to arbitration. There was one appeal to the District Court on a question of law.

Registrations.

The registrations affected during 1954-55, compared to those of 1953-54 are tabulated. The increase in the number of stock medicines, stock foods and pest destroyers registered may well be attributed in part to scientific developments in stock feeding and in treatment of pest and diseases.

	1953-1954.	1954-1955.
Apiary Registrations	3,897	3,902
Potato Licences	2,070	1,535
Stock Foods	707	800
Stock Medicines	1,179	1,249
Pest Destroyers	791	1,012
Sheep Brands	2,364	3,216
Sheep Earmarks	2,483	3,373
Large Stock Brands	2,095	2,235
Fertilizers	367	383
Farm Produce Agents	309	304
Veterinary Surgeons	353	365
Swine Brands (from February, 1955)	—	10,037
Swine Licences (from February, 1955)	—	179

Veterinary Surgeons Board.

Ten meetings were held by the Board. The Board continued its principal function of admission, removal and restoration of names to the Register of Veterinary Surgeons. Numerous complaints relating to veterinary practice were dealt with and a considerable amount of follow-up action was taken in respect of the advertising regulations published towards the end of the previous year.

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The prescribed examination for veterinary graduates of overseas Universities was held in September, 1954. Four of the five examinees were successful and were subsequently granted registration.

Personnel Section.

In collaboration with Commonwealth authorities training was provided for numerous FAO and Colombo Plan Fellows. The training included periods at Departmental institutions and with country officers.

Sustained interest in professional careers in agriculture was evidenced by increased enquiries and applications for traineeships tenable at the University of Sydney and the University of Technology, and for cadetships in Diploma Courses at the Agricultural Colleges.

Public Service classes in shorthandwriting and typing at metropolitan and country Technical Colleges attracted many junior officers. A notable increase occurred in the enrolment of males.

Tutorial assistance was given to clerical and field staff who undertook grade tests required by Public Service Regulations.

Many officers availed themselves of study leave concessions granted by the Board, to continue courses at the University and the Technical Colleges.

Plans are being prepared by the Department of Public Works for new office accommodation for Department of Agriculture staff located at Wagga, Lismore and Orange.

New, modern offices were rented for the Regional staff at Goulburn.

Staff Changes.

Appointments.—Dr. H. G. Belschner to *Emergency* Chief, Division of Animal Industry; C. C. Blumer to Chief, Division of Animal Industry; R. M. Watts to Deputy Chief, Division of Animal Industry; J. N. Henry to Chairman, Board of Tick Control; A. Johnson to Deputy Principal, Hawkesbury Agricultural College; C. A. E. Kiel to Assistant Accountant; N. K. Golding to Principal Veterinary Officer; J. D. L. McGibbon to Principal Dairy Officer; G. Nicholson to Assistant Principal Agronomist; D. A. Dickinson to Assistant Principal Veterinary Officer; G. J. Skillman to District Veterinary Officer; L. G. Williams to Special Veterinary Research Officer; C. Walkden-Brown to Special Agronomist; L. R. Kavanagh to Special Agronomist; C. J. T. Hawkins to Special Livestock Officer (Sheep & Wool); W. Brown to Supervisor, Public Watering Places.

Retirements.—E. A. Southee, Principal, Hawkesbury Agricultural College; B. J. Skelly, Assistant Accountant; A. B. Shelton, Principal Dairy Officer; W. H. Darragh, Senior Agronomist; L. S. Smith, Inspector-in-Charge; F. Ainsworth, Inspector of Stock; Miss M. R. Schachtel, Clerk; J. Clark, Gardener; C. D. Thompson, Gatekeeper; A. J. Caesar, Bean Seed Certification Officer; H. B. Maddocks, Garden Labourer; H. J. Williams, Garden Labourer.

Deaths.—L. C. Tomlinson, Livestock Officer (Sheep and Wool); L. W. Lockhart, Wool Metrologist; A. V. Tims, Agronomist; R. Ware, Clerk; R. Neill, Gatekeeper.

Returned from Overseas.—L. C. Yorke, Economics Research Officer, from post-graduate studies at Wisconsin University, U.S.A.; J. D. Colwell, Analyst, from England where he was a Walter & Eliza Hall Research Fellow; L. G. Williams, Special Veterinary Research Officer, from the United States where he was under a Rotary Foundation Scholarship; E. P. Foster, Inspector, Plant Diseases Act, from Borneo.

Overseas.—The Honourable E. H. Graham, Minister for Agriculture and Food Production; G. McGillivray, Chief, Division of Dairying; W. J. B. Murphy, Principal Livestock Officer (Beef Cattle); and P. S. Hill, Minister's Secretary, all visiting in United Kingdom and America as a stock purchasing delegation; P. G. Valder, Plant Pathologist, in United Kingdom as a Ben Fuller Travelling Scholar; B. G. Davey, Analyst, as T. L. Pawlett Scholar, also in the United Kingdom; J. N. Potter, Assistant Organiser, Agricultural Bureau, on private visit to Europe, studying agricultural extension methods.

Number of Staff at 30th June, 1955.

	Public Service Board.	Ministerial	Total
Central Administration	227	1	228
Division of Information and Extension Services	35	...	35
Division of Marketing and Agricultural Economics.....	32	...	32
Division of Science Services ...	108	...	108
Division of Plant Industry	171	...	171
Division of Dairying	164	...	164
Division of Horticulture	132	...	132
Division of Animal Industry—			
Head and District Offices	181	11	192
Meat Inspection Service ...	119	...	119
Queensland and Border.....	48	1	49
Tick Quarantine Areas	34	565	599
Hawkesbury Agricultural College	46	63	109
Wagga Agricultural College	22	41	63
Experiment Farms and Nurseries	135	219	354
Botanic Gardens.....	127	3	130
	1,581	904	2,485

Architect's Branch.

Loan Funds and Consolidated Revenue Funds expended on new works and maintenance work were as follow:—

	£
Loan Funds	174,715
C.R. Funds, and including Western Division	
Public Watering Places Fund	50,871

Work Completed.—This comprised stud cattle buildings, fencing and water supply, electrical extensions and town water supply at the Wagga Agricultural College and Experiment Station; a glasshouse at Yanco Experiment Farm; new buildings at the Coomealla Horticultural Research Station; and installation of electricity and dairy equipment at the Macquarie Fields Area of the Glenfield Veterinary Research Station.

Work Still Proceeding.—This includes the dairy products factory at Hawkesbury Agricultural College; the Agricultural Research Institute at the Wagga Agricultural College and Experiment Station; and two prefabricated sheds at the Tamworth Agricultural Experiment Station.

New works, which commenced during the year and are in course of construction include new shearing shed and yards at Hawkesbury Agricultural College; new administrative buildings, stewards' and officers' quarters and dining room, a dormitory block, eight cottages, the College oval, and a residence for the Director of Agricultural Research Institute, at the Wagga Agricultural College and Experiment Station; installation of domestic and irrigation water supply at the Coomealla Horticultural Research Station; a cottage on the Queensland Border at Riverton; glasshouses at Grafton Experiment Farm, Hawkesbury Agricultural College, Bathurst Experiment Farm and Botanic Gardens; and a new bore at Wanaaring.

Maintenance Work.—This consisted of painting and repairs to cottages and farm buildings at Lecton and Bathurst Experiment Farms, Glenfield Veterinary Research Station, Seven Hills Poultry Experiment Station and the Queensland Border; installation of electricity at the New England Experiment Farm and at Seven Hills Poultry Experiment Station; two new bores in the Wilcannia district; and the de-silting, etc., of tanks on the Public Watering Places in the Western Division.

Extension Service.—Many inquiries concerning building problems were attended to by letter or personal interview, and plans representing buildings to the value of £374,840 were supplied to farmers.

Pastures Protection Section.

Grasshopper Control Campaign.—The expenditure incurred to the end of June, 1955, made the total £312,000 for the campaign period August, 1953, to 30th June, 1955. Of this amount the State Government contributed £75,000 in 1953-54. The remainder is recoverable from landholders in pastures protection districts by means of the levy imposed under the Noxious Insects Acts, 1934-1954.

In view of the very heavy expenditure in this prolonged campaign, the Government decided that the levy should be imposed on all ratepayers in all Pastures Protection Districts.

In 1953-54 the levy had been imposed only on ratepayers in the forty-three Districts actually infested with the Australian Plague Locust.

By an amendment of the Noxious Insect Act in 1954 the Government also increased the maximum amount that may be levied under the Act from 1d. to 3d. per head of large stock and from ½d. to ¾d. per head of sheep; and this maximum rate was proclaimed as the amount to be levied by all boards on their ratepayers to recoup the Noxious Insects Destruction Fund.

Insecticides and equipment held by boards in the northern part of the Central Division are currently being transferred to the boards in south-western New South Wales to be ready for an anticipated outbreak there in the spring of 1955.

Revocation or Curtailment of Travelling Stock Reserves.—The Pastures Protection Section (Amendment) Act, 1951, provided for Travelling Stock Reserves or parts thereof to be withdrawn from the control of the pastures protection boards on the recommendation of the Minister.

In the period 7th December, 1951, to 30th June, 1954, a total of 1,359 applications for revocation of parts or the whole of travelling stock reserves was handled. This year 461 further cases were received.

Dingo Destruction Boards.—Last year's report indicated that the Government had decided to subsidise the rate income of dingo destruction boards up to 50 per cent. of that income. The decision gave dingo destruction boards the opportunity to make long range plans, secure in the knowledge of income from rates and Government subsidy each year.

This year the Pastures Protection Act was amended to provide for an increase from 9/40d. to 19/40d. in the maximum contribution payable by constituent pastures protection boards per acre of ratable land within the Dingo Destruction District. The only board which levied the maximum rate was the Southern Tablelands, and provision was made in the Act for that board to levy the maximum for 1955. The other three dingo destruction boards are levying well below the maximum permitted by the Act.

With its increased funds the Southern Tablelands Board proposes to expand its activities. The Lower North Coast and Tablelands Board is also contemplating an increased levy, with a view to employing a field officer to stimulate the activity of native dog associations through which the boards carry out dingo destruction.

Because of the Government subsidy, the Department will be represented at the meeting of each dingo destruction board when revenue and expenditure estimates for the subsequent year are being considered. Thus the Department will have some voice in the policy adopted by the dingo destruction boards.

Leases of Public Watering Places.—During the past twelve months, leases of public watering places in the Brewarrina, Broken Hill, Cobar, Hillston and Milparinka Pastures Protection Districts expired, and Ministerial approval was given to those boards to grant leases over 108 public watering places in their Districts.

Soldier Settlement Areas.—Arrangements continued for pastures protection boards to inspect and report upon the rabbit infestation of properties, brought under notice by the Department of Lands in the process of being taken over for Soldier Settlement.

Salaries of Stock Inspectors, Rabbit Inspectors, and Pastures Protection Board Secretaries.—Considerably increased salaries were provided for Stock Inspectors by a variation of the Stock Inspectors Award effective from 1st July, 1954. Application has been made by the Stock Inspectors for further increase in salary, and claims have also been lodged by the Secretaries and by the Rabbit Inspectors.

Superannuation.—The Local Government and other Authorities (Superannuation) Act was amended, and this increased from £1,000 to £2,000 the cover which may be obtained by Stock Inspectors, Secretaries and Rabbit Inspectors.

Any superannuation premium payable by an employee is borne in equal proportions by the pasture protection board and employee concerned. In the case of Stock Inspectors, half the amount payable by the respective board is contributed to the board by the Department of Agriculture.

Conference of Pastures Protection Board Secretaries.—A very successful conference of secretaries was held in February, 1955. Many items of administrative procedure were revised and improved.

Legislation.—The Pastures Protection Act and the Noxious Insects Act were amended. Reference has already been made to those amendments of the Pastures Protection Act affecting the contribution payable to dingo destruction boards by pastures protection boards.

In addition, the 1954 amendment provided for increases in the maximum general rates that may be levied by pastures protection boards, from 8d. to 1s. per head of large stock, and from 1d. to 1½d. per head of sheep. These increases were necessary to enable boards to meet the heavy commitments arising from generally increased costs and the substantial increases in stock inspector salaries. Many boards levying at the previous maximum rates were even so finding difficulty in balancing revenue and expenditure.

The Act was amended further to enable boards to order fencing, and repairs to fencing, between private lands and reserves on the basis of half contribution between landowner and board, but placing on the landowner the responsibility for full cost where the order was issued with the approval of the Minister. Several applications have since been received from pastures protection boards for the issue of a Ministerial order.

Another important amendment dealt with stock trespassing on travelling stock reserves; to exempt the stock of an adjoining landowner where there is no fence separating the reserve and the holding, but only where there never has been such a fence, and to provide that the onus shall be on the landowner to prove that there never has been a fence. This amendment was necessary to overcome a technical difficulty in the case of fences in disrepair.

Minor amendments to the Act provide for increased travelling charges for stock travelling on renewed Permits, from 2d. to 4d. per 100 sheep or 10 head of large stock, per mile; an increase from 1s. to 2s. 6d. for the issue of Permits where stock travel by motor-lorry; and board authority to insure the Directors against injuries whilst engaged on board business.

The 1955 amendment to the Noxious Insects Act, clearly restricted the Act to the Australian Plague Locust and the small Plague Grasshopper. The original Act prescribed "the grasshopper" as a noxious insect. Power has also been taken for the Department or a board to enter a property to carry out any necessary grasshopper destruction work and to recover the cost from the landowner. Reference has been made earlier in this report to the increased rates that may now be levied under the Act. The Act was amended in several other minor ways.

Biometrical Branch.

The design of experiments and the final statistical analysis of the results obtained from them are the principal functions of this Branch. Prompt service has been given to Divisions in all cases where such assistance was sought.

Advice on the design, analysis, or interpretation of experiments was given principally in respect of plant and animal breeding, animal nutrition, and agronomy.

Design advice covered such projects as:—

- The detailed planning for mating, and production testing, of poultry.
- The choice of fertilisers, and rates and times of application, for experiments with pastures and crops.
- The allotment of individuals to treatment groups in animal feeding experiments.
- Optimum plot and block size, and shape, with different crops and pastures.
- Border effect in small-plot work.
- Most efficient sampling methods for particular situations in the field.

Co-operation with Forestry Commission officers continued and a report was finalised giving estimates of basal areas and volume of timber, with their sampling errors, covering the management survey of seven forests in the Kendall district.

The lectures in Agricultural Biometry at Sydney University were again given by the Assistant Biometrician.

The proposed mechanising of the extensive records from dairy herd-recording has been advanced by the ordering of punch-card equipment. The particulars from all cows under test from 1st July, 1955, will be recorded mechanically on cards.

DIVISION OF PLANT INDUSTRY.

The growing appreciation by primary producers, agricultural organisations and others associated with agricultural production, is exerting a severe strain on the services. Agronomists are very much in demand by producers, who are continually expressing requests for the appointment of additional staff.

The position is acute inasmuch as it is not possible to fill existing vacancies, least of all subdivide the many districts that warrant that action. Agronomists' districts total thirty-three. One of them has been vacant since 1947, two have been vacant for some months, and two more vacancies are pending. The shortage of trained staff suited to district agronomist duties is likely to continue for some time.

Agricultural Extension Grant.—This Division is responsible for thirty-three of the sixty-three projects approved under the Grant. Approximately 225 demonstrations have been established, principally in inland districts and under irrigation. The most important are in respect of serrated tussock control; pasture improvement—in dry and irrigated areas; and advanced fertiliser practice.

Other projects cover improved practices in crop production, irrigation, weed and insect control, pasture seed and hybrid maize seed production.

Commonwealth Dairy Industry Extension Grant.—District agronomists assist the conduct of Dairy Industry Extension Grant demonstrations, of which the basis is largely pasture improvement. For the past twelve months an additional 107 demonstrations were approved. The success of these demonstrations has exceeded expectations and in no small measure has been responsible for vigorous adoption of pasture improvement programmes by coastal farmers.

Flood Relief.—District agronomists were active in emergency relief work during the 1955 flood crisis, and later in investigating claims for relief.

Wheat.

It is estimated that 3,157,650 acres were sown in 1954 for all purposes. Of 2,780,000 acres sown for grain, 280,000 failed entirely.

Approximately 37,500,000 bushels were harvested, the smallest wheat crop since 1946-47 when a very severe drought occurred. Average yield of 13.5 bushels per acre was 2 bushels less than the State's average yield for the past ten years.

The trends towards wider crop rotations to include pasture species, and towards mechanisation of harvesting, including bulk handling, continued.

Grain Quality.—In general, grain samples were not attractive and showed the effects of the unfavourable season. Some grain was pinched, due to frosting, dry weather and stem rust, some was bleached and discoloured, and some was sprung and shot. Weed seed and other foreign matter were more prominent than for some years, due primarily to the season.

The F.A.Q. was declared at 61½ lb. per bushel as compared to 64 lb. in the previous year. The average protein content was 11.5 per cent., which is above normal, and due mainly to the rapid maturity of crops. This is an important factor in quality.

Varieties.—The general variety pattern was much the same as last year. Statistics for 1953-54, the latest available, show that the following are most popular varieties: Bencubbin, 38.2 per cent. of the acreage; Gabo, 15.78 per cent.; Kendee, 7.64 per cent.; Ford, 4.5 per cent. Charter has dropped to seventh place with 3.21 per cent.

Several new varieties are being widely tested. In the south, comparisons of Curlew, Broilga, Bencubbin, and Javelin indicated that Javelin is superior or at least equal to Bencubbin under such dry conditions as were experienced.

The varieties are being compared again this year. In the north, Festival has increased from 8,500 acres in 1952-53 to 55,500 in 1953-54. The variety will be sown on an even larger scale this year. Where the rust epidemic was severe, Festival maintained a satisfactory resistance. Increase in Festival has been mainly at the expense of Charter, a variety of equally good baking quality.

Wheat Diseases.—A minor stem rust epidemic occurred after spring rains. Yield and grain samples were affected by it only in the eastern portions of the north and central-western slopes. At all centres, the Departmentally bred variety Festival was highly resistant to stem rust. The increased acreage of this and other rust resistant varieties, particularly in the north-west, has been a valuable contribution towards safer yields.



Seed Wheat Studs.

The Department's Experiment Farms supplied Foundation seed of seventeen wheat varieties to ninety growers of registered seed wheat.

The registered growers seed-increase the varieties under the supervision of district agronomists, for seed distribution to wheat farmers in general.

(Photo. from Temora Office.)

Spica, a rust resistant variety from Queensland, is being widely tested. It is expected to achieve popularity in the north-west.

Ball smut or bunt was reported from some districts, but not as prevalent as in previous years. The necessity for continued care in dusting all seed wheat was publicised.

The Department, in conjunction with Sydney University, is testing a new Kendee x Gabo flag smut resistant line which, because of that resistance, compares favourably to Gabo which is widely grown but susceptible to flag smut. Should this new line compete with Gabo for acreage, there will be no effect on State protein level as they are of equal baking quality.

WHEAT IMPROVEMENT.

Breeding.—Breeding programmes in N.S.W. are now co-ordinated as between the Agricultural Research Institute, Wagga, in the south and the University of Sydney, in the north. The accent of these programmes is "quality", coupled with yield and disease resistance.

In the north the breeding programme has tended away from the strong flour types to a more intermediate quality group comparable to Gabo. Work on winter wheats is also progressing.

In the south, a back-crossing programme has commenced at the Agricultural Research Institute, Wagga. One of the main objectives is to replace such high yielding and popular, but low quality varieties as Beneubbin, by quality types with equivalent yield and other field characteristics.

World Rust Nursery.—This nursery and the wheat variety collection have been maintained at Glen Innes and were increased this year by introductions including 365 lines from the United States Department of Agriculture for testing.

Durums.—A leading canner's interest continued in growing durum wheats for a suitable type of semolina for macaroni manufacture. The durum wheat programme was advanced a further stage, and arrangements have been made with selected north-western farmers to sow the most promising line, Aleppo x Palestine, for seed increase.

Wheat Experiments.—Extensive yield and quality testing of varieties was continued at Experiment Farms and Stations. In addition, wheat extension plots conducted with farmers for

yield and demonstration purposes comprised fifty experiments with forty-one farmers in sixteen agronomists' districts. More farmer experiment sowings have been arranged for 1955-56.

Fertiliser Trials.—Wheat fertiliser trials following a pasture ley period were initiated this season on farmers' properties. This is increasingly important in view of the trend to wider crop rotations in wheat growing.

Time of Sowing Demonstrations.—These have highlighted the need to sow varieties at the correct time in relation to their maturity. The demonstrations at Condobolin and Temora Experiment Farms have now been discontinued. Articles are being prepared for publication.

Wheat-pasture Rotations.—Trials and demonstrations are under way at Experiment Farms to clarify problems associated with cropping land previously under pasture. The trials include:—

Effect of sown *versus* volunteer pasture on wheat yields.
Rate of superphosphate application to wheat after improved pasture, and

Experiments to ascertain best method of changing from pasture to arable phase.

Results have demonstrated that wheat sown after pasture containing a legume yields better and produces grain of higher protein content than wheat sown on land which has been allowed to regenerate naturally.

Steps are being taken to initiate a comprehensive rotation experiment at Condobolin Experiment Farm and a similar experiment has been approved for Temora Experiment Farm.

Several Agricultural Extension Grant demonstrations (pasture sown with wheat) were successfully established despite adverse conditions in 1954.

Field Wheat Competitions.—Five divisional championships were conducted by the N.S.W. Royal Agricultural Society along similar lines to those of previous years. The championship field judging was arranged by this Department. In addition, the Royal Agricultural Society conducted a special field wheat competition in the southern slopes division, using a scale adding points for grain quality, and eliminating championship judging in the field. A further, revised southern slopes division competition has been arranged for the 1955 harvest.

The increasingly popular, Departmentally bred Festival took first, second and third places in the northern division championship. The Departmental variety Celebration took the major prizes in the southern slopes championship.

Junior Farmer, Wheat, State Championship.—Twenty-three Junior Farmers from eleven clubs took part in the Statewide wheat growing project. Some particularly good wheat yields were obtained. Several exceeded 50 bushels per acre.

Foundation Seed.—Despite the season, sufficient foundation seed of wheat and oats was produced to meet the needs of main experiments and of Registered seed growers.

Initial selection and preliminary increase of oats and wheat is now mainly undertaken at Temora Experiment Farm, where a pure-seed officer has recently been appointed. This should result in a higher standard of seed to farmers. Initial selection, preliminary increase, and Foundation sowings of some oat varieties suitable for northern tableland conditions have been undertaken. Foundation seed is also being produced at Wagga, Condobolin, Trangie, Leeton, Cowra and Tamworth Experiment Farms/Stations.

Registered Seed.—In 1954, Foundation Seed of seventeen wheat varieties was supplied to ninety Registered seed wheat growers, who will undertake seed increase, and to seventy-six Registered seed oat growers who will seed increase nine oat varieties. These Registered seed growers are working under the supervision of district agronomists, seventeen of whom are involved.

Arrangements have been made to supply Foundation seed from the 1954-55 harvest to an increased number of Registered seed growers.

Oats.

The area sown to oats for all purposes was estimated at 1,115,000 acres. Grain yield was estimated at 7,000,000 bushels from an above average area of 530,000 acres, averaging 13.2 bushels per acre. Hay yield was estimated at 110,000 tons from 125,000 acres, averaging 0.9 tons. Due to the dry season, crops were more severely grazed than usual.

Except for some loose smut and rust, oat crops were relatively free from disease this season.

Oat Variety Tests.—Oat variety testing continued at Experiment Farms and on farmers' properties.

The Temora Experiment Farm hybrid F.F.G. Markton maintained its promise under the dry conditions. It is being seed increased this year with a view to naming and release.

The introductions Fulgrain 6, Osage, and Victorgrain 4 are promising for grain production and will be more widely tested. A New England Experiment Farm hybrid V.R.A. W4304 has yielded well in southern trials in comparison to Algerian for grazing and grain. It is being seed increased for wider testing. Garry, a rust resistant Canadian variety, has yielded well under northern tableland conditions, especially for spring sowings. Arrangements are in hand for Foundation seed sowings of this variety.

Variety Trends.—The newer varieties Dale, Ballidu and Orient are being more widely grown by farmers. They compare favourably with Belar and Fulghum in yields of fodder and grain and it will be interesting to see the areas of these varieties grown when the next oat variety census is taken.

Barley.

The area sown for all purposes in 1954 was estimated at 64,246 acres, compared to 40,697 in 1953 and 24,720 in 1952. Barley is still a minor crop but interest in it is increasing. Expansion in production is dependent upon an assured demand for barley grain.

Barley Trials.—Malting types were compared to Pryor, and feed types were compared to Cape and Trabut. Yields of over 100 bushels per acre were obtained at Cowra Experiment Farm.

Barley Breeding.—This is in abeyance until the staff position and increased barley production warrant a recommencement of breeding. Fixed hybrids at present being tested are not significantly better than the variety Pryor.

Barley Seed Production.—Pure seed production continued at Wagga Experiment Station in 1955. The complete failure of these areas in 1954 further delayed the release of the new Departmental variety Ablyn.

Barley v. Oats, Fodder Trials.—Fodder trials comparing barley and oats were generally unsatisfactory at Experiment Farms in 1954. New England Experiment Farm was the only Farm to obtain a harvest.

Rye.

Only small areas were sown, but interest is increasing because of an increased demand for rye flour.

In strain trials at Condobolin Experiment Farm the strain "Weethalle" yielded significantly better than others and a seed increase area has been sown. Seed increase of Black Winter and a few promising strains is continuing at New England Experiment Farm.

Maize.

The 1954-55 season was poor for maize growing. On the north coast, the main maize area, protracted wet weather in spring prevented preparation of ground for sowing. The six weeks dry period in the summer was followed by an excessively wet autumn. This led to leaf blight in early maturing hybrids and a great deal of mould in ripening late maturing crops. Floodings in February and May destroyed many fine crops in Hunter and Hawkesbury River districts.

It was estimated that near to 60 per cent. of the maize acreage was sown with hybrid seed.

Hybrid Maize Improvement.—Programmes continued at Grafton and New England Experiment Farms. The Hawkesbury Agricultural College programme has been terminated.

Mid-season hybrids of a type suitable for the upper north coast were included in district trials for the first time. Many new lines also were given their first reasonable trial.

One white hybrid was sown in a few preliminary trials on the south coast, though demand for white types is not keen.

An additional agronomist was appointed to Grafton Experiment Farm to breed early maturing hybrids highly resistant to leaf blight, which is probably the most destructive disease at present. He will also aim to incorporate male sterility, of the Texas type, in the standard inbred lines.

A reasonably good season on the northern tablelands and the leasing of a few acres of irrigable land on the Mann River for maize breeding purposes helped to advance the activities at New England Experiment Farm. Inbred lines from Wisconsin, U.S.A., tested on this Farm, appeared promising for the development of very early hybrids.

District Trials.—Approximately thirty-five trials for grain production and seven for fodder were sown. Results are expected from most but others were lost through cyclonic weather and flooding in the autumn.

Hybrid Maize Foundation Seed Production.—The overall picture is much brighter than last year's. Reasonably good yields of seed have been obtained at both Grafton and New England Experiment Farms, and four co-operating farmers have also had good results. There will thus be no difficulty in supplying the demands of Certified seed growers for 1955 sowings.

The first mid-season hybrid from Grafton Experiment Farm will be released for Certified seed production in the coming season.

Hybrid Maize Certified Seed Production.—The previous Registered seed scheme has now been replaced by a full Certification scheme. About 9,500 bushels of Certified seed are expected from this year's harvest as compared to 9,800 bushels of Registered seed from the preceding season.

The season has been unkind to seed growers, some being unable to sow because the wet spring prevented preparation of land. Several crops were destroyed by floods, and the wet autumn caused more disease than usual in seed crops. Sixty-nine growers were allocated areas for seed production, but only fifty-eight will produce seed. Some crops were rejected for Certification because of imperfect detasselling.

Maize Investigations.—Fertiliser and spacing trials, and seed treatment trials have been continued at various locations.

Sweet Corn.

Less than 1,000 acres of sweet corn were sown this year though canners estimate an overall 25 per cent. increase in sowings as compared to last year. However, the season in the Windsor district was unsatisfactory. Only about the same area as last year's, approximately 300 acres, was harvested there. Average yield for the State would be 3 to 4 tons per acre.

The quantity of Golden Cross Bantam seed produced this year was about the same as last year, 300 bushels. This will be sufficient for normal, commercial requirements. Thirteen bushels of Iochief, a new, hybrid which has given excellent

results in yield and canning tests, were produced for commercial purposes. Adequate supplies of Foundation seed are on hand for the coming season's hybrid seed production areas.

A normal breeding programme was resumed at Yanco Experiment Farm, when the agronomist responsible for this work returned from a scholarship period in Italy.

Popcorn.

The Leeton and New England Experiment Farms' programmes yielded good results. Hybrids continued to perform well in trials.

The interest of processors indicates a big demand for hybrid popcorn as soon as supplies enter the market in quantity.

Limited production of Certified seed is planned to commence in the coming season.

Sweet Sorghum.

This crop is becoming more popular, particularly in dairying districts. About 30,000 acres are sown annually. Yields range up to 35 tons of greenstuff per acre.

Since the hybrid maize programme at Hawkesbury Agricultural College has ended, a full-scale improvement programme for sweet sorghum has been commenced there. Saccaline is the variety receiving most attention at present. At Grafton Experiment Farm the work with White African continued. The Early Orange programme has been transferred from Mr. A. Woolley of Nowra to Mr. G. Paten of Moruya.

Further complaints of poor quality sweet sorghum seed have been received. It is hoped that farmers will in future purchase only Certified seed. This will be available for sowing in the coming season because of the Department's Certification scheme which commenced this year. Twenty-four growers have submitted 125 acres for Certified seed, and at least 3,000 bushels of seed may be certified.

Ten district yield tests and two seed treatment trials were sown this year.

Grain Sorghum.

The season has been a good one in all grain sorghum areas. Yields of 60 and more bushels per acre have not been uncommon.

Foundation seed production of recommended varieties continued at Yanco and Leeton Experiment Farms. Some newly introduced varieties were also seed increased for yield testing.

The variety trial and irrigation investigations were continued at Yanco Experiment Farm. The fertiliser trial was carried on at Leeton Experiment Farm.

Eleven district trials were sown mainly in north-western and irrigation districts.

The variety Alpha from Queensland shows promise.

Broom Millet.

Good crops were produced only in the Tumut district, where 5,800 cwt. of fibre were harvested. This was approximately 90 per cent. of New South Wales production this year because elsewhere the season was poor for this crop.

The improvement programmes at Bathurst Experiment Farm and Tumut were continued. An improved strain from Bathurst will be tested and seed increased at Tumut in the coming season.

Most of the U.S.A. introductions at Grafton Experiment Farm have proved inferior to local strains and have been rejected.

Fodder Millets.

Japanese millet is increasingly popular in most districts but Siberian millet is challenging it on the north coast for late sowing. Starr pearl millet introduced from the U.S.A. will be tested against Japanese and Siberian as soon as sufficient seed has been built up.

Sudan Grass.

Sudan grass is becoming more important in many districts, but the north-west is its main location. The S.S.6 sweet Sudan strain introduced from Queensland in 1953 has given very good results. The area sown to it is expected to increase rapidly over the next few years.

Columbus Grass (*Sorghum almum*).

Improvement has been commenced at Grafton and Trangie Experiment Farms. This grass appears to have a great potential for New South Wales if a type low in cyanic acid and free of rhizomes is developed. New strains from overseas are also under test at Grafton.

Fodder Cane.

The variety trial at Grafton Experiment Farm now includes three additional varieties.

Summer Legumes.

Trials and limited seed production continued at Grafton Experiment Farm with soybeans, cowpeas, sunn hemp and other *Crotalaria* spp., velvet beans, mung beans, lab-labs and kudzu. District trials were continued on the central and north coast.

Soybean trials and seed production continued at New England Experiment Farm.

Winter Legumes.

Seed production of Lima and Kellerva field peas continued at Grafton Experiment Farm. Staff changes prevented work with field peas intended at New England Experiment Farm.

Rice.

General.—Rice farmers experienced ideal seasonal conditions. The 1954-55 yields constituted a record. Final figures are not available at 30th June but some 90,000 tons were harvested in New South Wales, with an average of 2.5 or more tons per acre in the M.I.A. The previous record of 2.35 tons per acre occurred in 1951. An average of 4.1 tons obtained over 63 acres in a crop at Griffith is a Murrumbidgee Irrigation Area and probable world record for a mechanically harvested crop of rice. A grower in the Wakool District also stripped over four tons per acre from 25 acres.

Factors Affecting Record Crop.—The excellent yields reflect in part the Pure Seed Rice Scheme introduced by the Department of Agriculture in co-operation with the Rice Marketing Board, the widespread soil fertility improvement from improved pasture sowings, and the improved design and layout of irrigation bays.

Variety Improvement in the Wakool District.—The Department's variety improvement programme in the Wakool District is meeting with success. Eight bags of Tooth's Early Strain received in 1953-54 have since been increased to 300 tons of seed available for the 1955-56 season. Tooth's Early Strain is 10-14 days earlier than the standard Caloro 2 variety. Hungarian selections tested this year were five weeks earlier than Tooth's Early Strain and yielded as well. This promising work is being continued by the Barham district agronomist.

Rice in the Denimein Irrigation District.—Rice growing proved a success in the new Denimein Irrigation District with an average yield of 2½ tons per acre. This success has increased land values and opened the way for improved pasture establishment on heavy clay, problem soils.

Commonwealth Agricultural Extension Grant demonstrations were continued, to show farmers modern production techniques.

Tobacco.

Tobacco Breeding.—Breeding continued at Bathurst Experiment Farm for leaf quality, male sterility, and resistance to blue mould, mosaic and nematodes.

The breeding programme is being accelerated by the erection of a glasshouse at Bathurst Experiment Farm. A dehydrator also has been installed.

The record wet summer established ideal conditions for blue mould attack and in field trials a number of resistant hybrids were detected.

Several field selections of commercial varieties which showed no symptoms of blue mould were made in the hope of securing a tolerant strain of a commercial tobacco.

Only the variety Bel 8-4 has shown any resistance to nematode attack this season.

Tobacco Trials at Bourke.—Trials at Bourke in association with Mr. J. Kerr, an experienced tobacco grower, this year proved that leaf of excellent quality and yield can be produced in that district. Mr. Kerr's tobacco averaged 150 pence per pound at the Brisbane Sales.

Hops.

The 1/10th acre hop trial at Bathurst Experiment Farm again yielded very good results. A selection of the variety Golden Cluster yielded at the rate of 2,100 lb. of cured hops per acre and was equal to the Tasmanian product in quality and yield. Quality tests were conducted by Terry's Brewery Ltd., Lithgow.

New South Wales produces no hops as yet. It imports more than £750,000 worth from Tasmania and overseas countries each year.

Departmental trials have now shown that there is no agricultural reason why hops should not be produced in the Bathurst-Hartley territory or in such districts as Tumut and the Hunter Valley.

Linseed.

Farmers considered the offered price of £70 per ton to be below the cost of production. In consequence the area sown to this oil crop remained small (1,000 acres).

Crushers are offering £70 per ton for the next crop, and because of growers' uncertainty in respect of wheat markets a larger acreage of linseed may be sown.

Linseed Breeding.—Breeding is now centred at Tamworth Experiment Station. Plots were also sown at the University Plant Breeding Station, Curlewis and in the Pallamallawa district near Tamworth. The variety Plate, introduced by the Department, has been released for commercial growing.

Safflower.

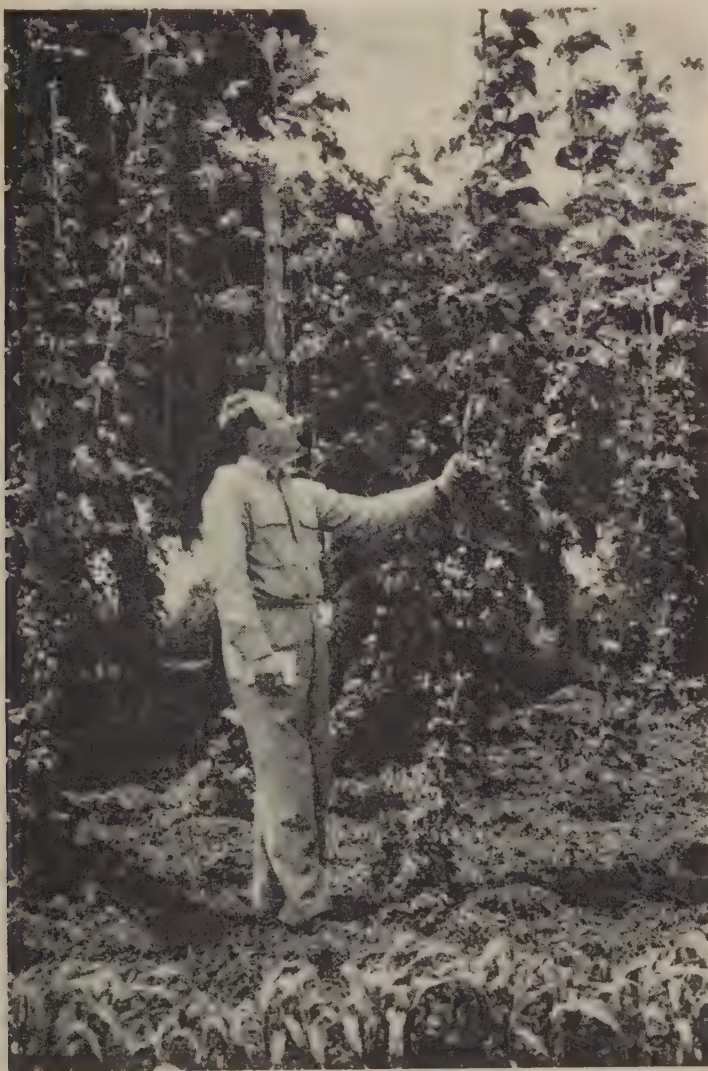
A Tamworth Experiment Station trial showed safflower returns of £55 per acre, as against £35 for linseed and £20 for wheat. Safflower is a potential commercial crop in the north-west of New South Wales in view of the high returns and the fact that machinery for wheat production is suitable for safflower.

Varieties from the C.S.I.R.O. are being seed increased, under Departmental supervision, by farmers.

Peanuts.

The peanut acreage was considerably reduced, following unsatisfactory returns to far north coast growers.

Variety improvement work continued at Grafton Experiment Farm. Cultural trials were conducted at the Terranora Demonstration Area.



New South Wales Could Produce Hops.

Golden Cluster hops in trials by Bathurst Experiment Farm equalled the Tasmanian product for quality and yield.

The Experiment Farm has named several districts wherein there is no agricultural reason why this industry should not be successful. New South Wales as yet imports £750,000 worth of hops per year.

(Photo from Bathurst Office.)

Far Western Demonstration.—In an Agricultural Extension Grant demonstration on the property of Mr. G. Glover, "Llandillo", Bourke, the crop was again a success. It yielded 12 cwt. of nuts per acre and but for rain just prior to harvest may have yielded 1 ton per acre. Maclean Valencia and Standard Valencia were the best varieties.

The trial is successfully demonstrating the suitability of the lighter, western river soils for peanut production under irrigation.

Castor Beans, Sunflowers, etc.

Work with castor beans, sunflowers, lavender, pyrethrum, ramie, kenaf, and other miscellaneous crops, was continued.

Strains and pure seed lines are maintained and overseas introductions are tested.

Vegetable Section—General.

The principal agronomist (vegetables) returned from investigations in the United States of America, Canada and the United Kingdom, and has submitted a report on his observations.

Resignation of the Bathurst Experiment Farm agronomist who supervised the potato investigational projects and seed certification on the southern and central tablelands, and resignation of the bean seed certification officer adversely affected the work of the vegetable section.

A potato seed certification officer was appointed in September to supervise the production of Certified potato seed at Crookwell and on the central tablelands. Formerly this work was carried out in the main by district agronomists.

Glasshouse facilities now at Hawkesbury Agricultural College, Yanco Experiment Farm, and Bathurst Experiment Farm have enabled a revised and expanded breeding programme to be initiated.

Potatoes.

Breeding.—The breeding programme has been continued at New England Experiment Farm. All new seedlings were grown at the Mann River sub-station. Promising seedlings were preliminarily tested at Crookwell, Guyra and Glen Innes.

Twenty-three different crosses were made using disease resistant, introduced varieties and locally developed breeding lines and varieties. They included Sebago, Sequoia, Snowflake, Monak, Bismarck, Aquila, Walanga, Ackersegen, Ontario and Menominee, the breeding lines 66-10, 11-79 and CZK-7, and Departmental seedlings S2540 (Factor x Katahdin) and S2680 (Gold Coin x Saranac).

About 9,000 new seedlings were transplanted to the Mann River sub-station. Selection was more lenient this year and 1,000 were retained, including two complete progenies. Once again the seedlings of Monak x 11-79 were outstanding, and a promising set of selections was made from this line. The cross Walanga x 11-79 also stood out. Two quite good selections were made also from S2680 x Adina.

Approximately 340 second-year seedlings were planted but the heavy February rains caused serious rotting. Some very valuable material was thereby lost.

Third- and fourth-year seedlings were not so badly affected by the heavy rain and, from 150, 40 were selected for testing in the preliminary yield trial next season.

Sixty seedlings and varieties were grown in the preliminary yield trial. Several seedlings out-yielded even the high-producing, recently-named Walanga.

New Variety Released—Walanga.—The new variety released to commercial growers was named Walanga. It is a selection from (Satisfaction x Douglass' Seedling) x Katahdin. It also appears to have some resistance to frost, and either resistance to or ability to escape from drought. The late maturity of Walanga has created considerable South African interest in the variety.

Testing for Resistance to Common Scab (*Actinomyces Scabies*).—The ferric chloride test for estimating scab resistance was conducted on a number of varieties and seedlings which have been field tested for scab reaction. According to the test, the most resistant varieties were Ackersegen, S2860, Craig's Bounty, Saranac and Menominee.

Potato Introductions.—Twenty-three introductions were made. Only three so far have been grown, and unfortunately these were flooded. Elsa, a Swedish variety, yielded quite attractive tubers of high specific gravity and may be used as a parent.

Potato Storage Tests.—Observational tests were carried out over a five and a half months' period, using six named varieties and twenty Departmental seedlings. Seeding S2781 (Smooth Rural x Katahdin) was the outstanding sample, quite firm and attractive at the end of the test. Walanga and Sebago were the best of the named varieties. Crana and Awaba were disappointments.

Soil Fertility Investigations.—In the soil fertility demonstration area at Guyra differences between the potatoes grown after temporary improved pasture and those grown after oats or natural pasture were well defined. A field day was held, on the one hand to demonstrate the type of pasture that can be established on the red potato soils of Guyra and, on the other, the higher yields of potatoes and oats that can be obtained when a good clover pasture is included in the rotation.

Potato Cooking Tests.—Samples of seedlings and varieties were forwarded to the East Sydney Technical College for cooking tests and specific gravity determinations. There was a marked preference by the judging panel for Virgil, obtained from the United States Department of Agriculture. Seedlings S2702 (Factor x Katahdin), S2704 (Sequoia x Katahdin), S2705 (Kerrs Pink x Katahdin), and S2706 (Sequoia x Katahdin) were considered to be the best of the other samples.

Variety Trials.—Twenty-seven variety trials were conducted, distributed over the main potato districts.

In the Hawkesbury district trial, Glen Ilam, from New Zealand, with 16.3 tons per acre, was the highest yielding. Unfortunately it is prone to second growth. Departmental seedling S2705 (Kerrs Pink x Katahdin), despite being one of the earliest maturing, gave the second from highest yield and the tubers were reasonably attractive.

Glen Ilam was also the highest producer in the near metropolitan trial. In this case the yield was 20.7 tons per acre, but again some second growth was reported. Sebago, with second from highest yield, gave the best all-round performance.

In the Macleay River trial, Sebago and Sequoia were in general the most satisfactory. Adina and Crana were also very good. 1280-17 gave the highest yield, with a high proportion new grade, but it is too late maturing for such an early area.

At McAlister, on the southern tablelands, separate trials were conducted for early and late maturing varieties. Of the early varieties S2705 (Kerrs Pink x Katahdin), Exton, and S2704 (Sequoia x Katahdin) performed best; Walanga and Adina were superior among the later maturing varieties.

Potato Seed Certification.—A total of 171 growers submitted 1571 acres for certification, compared to 209 growers and 1840 acres in 1953-54. Altogether 1,255 acres grown by 133 growers were certified, as against the previous year's 1,714 acres grown by 198 growers. The main varieties were Sebago 504 acres (526 acres 1953-54), Sequoia 244 (326), Monak 131 (286), Factor 64 (77), Exton 58 (48), Adina 54 (121), Awaba 35 (17) and Crana 33 (21). The following figures show the decline in the acreage certified since the peak year of 1951-52.

Year.	No. of Growers.	Acreage certified.
51-52	258	2311
52-53	207	1729
53-54	198	1714
54-55	133	1255

Potato Moth Control Demonstrations.—In the preceding season, fifteen demonstrations of D.D.T. spraying gave spectacular results. During the currency of those demonstrations many growers adopted the practice, and the 1954-55 season has been a further extension of this means of control. The practice having been fairly generally adopted, only five demonstrations were considered necessary this year.

Potato Production Demonstrations.—A project to demonstrate the practicability of growing potatoes in certain districts where they are not grown at present was approved in 1953-54. Four demonstrations under this project were conducted, at Nundle (2), Uralla and Cooma.

Chemical Treatment of Seed Potatoes.—A pre-emergence treatment trial, of nineteen different treatments, on the varieties Monak and Sequoia was fulfilled at Bathurst Experiment Farm. The effect of treatment on germination percentage appeared to favour Sequoia more than Monak. Dipping in Tetroc, Baytan, and 6638-39 (Ethoxyethylmercuric chloride) were efficient preventives of pre-emergence decay of cut tubers. Esso and T.M.T.D. dips, and Tetroc as a dry dust, showed promise. 6638-39, Baytan, Glycerine, and dry Tetroc reduced *Rhizoctonia* infection.

Tomatoes.

Tomato Breeding.—Breeding for resistance to fusarium wilt continued at Hawkesbury Agricultural College. 1050 plants, comprising second and third generation back-crosses and reputedly resistant varieties, were inoculated with pathogenic strains of the fungus received from the Biological Branch and were transplanted in a previously infected soil. Observations were taken every week during growth. It was quite evident that the existing material has much lower susceptibility to fusarium wilt than had the material in the 1953 trial. The most promising selections were from the second and third backcrosses of Marmande x A160 and the introductions *Lycopersicon pimpinellifolium*, Pan American, Marglobe, Hawaii and Lanai.

At Yanco Experiment Farm, breeding and selection for wilt resistance also had, as a major aim, improvement of the canning types. Twenty-three varieties were selected for further work.

Tomato Hybrids.—Hybrids once again yielded particularly well in trials at Hawkesbury Agricultural College and Yanco Experiment Farm, even in the F2 generations. Grosse Lisse was outstanding as a parent, and crosses with Valiant, Rouge de Marmande, Potentate and Tatura Dwarf Globe gave best results.

Introductions.—About fifty introductions, mainly from the United States were tested at Hawkesbury Agricultural College, Yanco Experiment Farm and Bathurst Experiment Farm.

Possibly the outstanding variety was Red Top from the United States Department of Agriculture. It is an early dwarf type producing a heavy yield of excellent quality fruit. It has a uniform ripening habit and seems ideally suited for sauce making.

Other promising lines were Chesapeake, Manalucie, Moscow, Garden State, Master Marglobe, and Valiant, all from the U.S.A., and Hettner's Large Red from the Department of Agriculture, South Australia.

More use is being made of material from the C.S.I.R.O., particularly as parents for breeding disease resistant stocks.

Further work has been done on the John Baer male sterile lines.

In a trial at Bathurst Experiment Farm, Sugawarra gave the highest yield, 25 tons per acre, compared to 19½ tons of Grosse Lisse. Two Grosse Lisse x Tatura Dwarf Globe hybrids were very high in solids content and appeared highly suitable for canning.

School on Hybrid Tomato Seed Production.—In December, 1954, a short-term school for potential hybrid tomato seed producers was held at Hawkesbury Agricultural College.

Over the past few years the Department has narrowed down the commercial varieties suitable as parents for tomato hybridisation. As the Department does not intend to participate in commercial, hybrid seed production it was desired to instruct seed firm representatives and others in the technique of producing hybrid tomato seed and in the method of maintaining male sterile parents.

Beans.

Breeding.—Breeding for disease resistance was continued at Hawkesbury Agricultural College.

Seed of eight crosses in the F1 generations, six in the F2 generation and respectively four, two, four and three crosses in the F3, F4, F5 and F6 generations were grown.

The main parents were Brown Beauty, Red Mexican, Doppelti, Hawkesbury Wonder, Windsor Longpod, Fullgreen, Logan and Granda. Twelve parent varieties and five cross-breeds of advanced generation were compared and further selections made.

Hawkesbury Wonder x Granda gave the highest yield of all cross-breeds and was 5-6 days earlier than most.

Seven lines of Fullgreen x Brown Beauty in the seventh generation were free of American common blight during a severe epidemic of the disease. (Landreth Stringless x Brown Beauty) x Little Navy was completely immune to Anthracnose races 1 and 2 and was used extensively as a parent.

Other crosses which showed varying degrees of resistance to Anthracnose were:—(Brown Beauty x Little Navy) x Red Mexican; Brown Beauty x Red Mexican; Brown Beauty x Doppelti; Hawkesbury Wonder x Red Mexican; Windsor Longpod x Red Mexican; and Fullgreen x Brown Beauty.



Millet for Brooms.

Bathurst Experiment Farm's research programme has yielded an improved strain of broom millet.

This strain will be further tested and seed-increased on Tumut farms in the ensuing season.

(Photo. from Junece Office.)

White seeded selections of Hawkesbury Wonder x Little Navy and Clarendon Wonder x Little Navy, in the fifth and sixth generations, were promising for the production of dry shell beans. Apart from being disease resistant these lines were heavy croppers and of concentrated maturity. They have a bush habit which is a distinct advantage in curing and mechanical harvesting.

Bean Introductions.—Among some twenty introductions mainly from seed firms in the United States of America, several were very promising. Seminole, a midseason bean from the United States Department of Agriculture was probably superior to all others tested at Hawkesbury Agricultural College and Yanco Experiment Farm. Seminole grows a large plant with abundant foliage. Pods are round, straight, stringless, fibreless, tender, of good flavour, and medium green colour. It has good disease tolerance and yields well.

Other beans with good prospects, particularly for canning and freezing were Processor; King Green and Hyscore, white seeded varieties; Wade; and Contender, all from the U.S.A.

Of the climbing beans the best were St. Louis Perfection; White Cornfield Improved; and Blue Lake Stringless FM-1, all from the U.S.A.

Bean Seed Production.—Of 385 acres submitted by growers on the far south coast for certification under the bean seed certification scheme, 55½ acres were rejected, chiefly because the crops were harvested for the green market and because of excessive weed growth. The acreage certified included 266 acres of Brown Beauty (2,820 bushels), Hawkesbury Wonder 29 acres (340 bushels), Tweed Wonder 10 (130), Wellington Wonder 5½ (70), Gowards Special 9½ (130) and Windsor Long-pod 4½ (65). Seventy bushels of other varieties brought the estimated total yield certified to 3,695 bushels—692 bushels more than the yield of the previous season. The mottle leaf strain of Tweed Wonder has now been eliminated and the resistant Tenterfield Strain is the only one grown. About six years ago mottle leaf had reached very serious proportions.

Green Peas.

Breeding.—The season, very dry early and very wet later, hampered the breeding work at Hawkesbury Agricultural College. Seed of four different F₂ crosses and eight different F₁ crosses were sown, together with many introductions. Several plants of the F₂ generations of Super Alaska No. 30 x Greenfeast and Super Alaska No. 30 x Coopers Canner No. 75 were most promising.

Introductions.—Of the introductions tested at both Hawkesbury Agricultural College and Yanco Experiment Farm New Era and Green Crop were outstanding. New Era, from the United States Department of Agriculture withstood the dry conditions very well. Green Crop, from the New Zealand Department of Agriculture, is earlier and more uniform in maturity than Greenfeast.

Others worthy of note were Feltham First; Dwarf Defiance; Lathon Wonder; Early Dwarf; and Early Wonder, all from England. Mosaic Resistant, from the New Zealand Department of Scientific and Industrial Research, was retained for use in the breeding programme.

Onion.

Breeding.—Ten lots of hybrid seed material were received from the United States Department of Agriculture and sent to Hawkesbury Agricultural College early in 1955. Four of them are hybrids and six are lines for producing two of these hybrids. All ten lines were sown in the glasshouse to secure maximum bulb production for future seed requirements.

Cucurbits.

Rockmelons.—Rio Sweet, from the United States Department of Agriculture was by far the most consistently outstanding Rockmelon at Hawkesbury Agricultural College, Yanco Experiment Farm and the Gosford Citrus Experiment Station. It is resistant to powdery mildew; and downy mildew did not spread beyond the point of initial infection. The fruit is netted and of good quality.

Each of seven varieties introduced from Afghanistan was very disappointing.

Some crossing of varieties was done at Yanco Experiment Farm using DPMR 90008-1 as the disease resistant parent.

Watermelons.—Dunbarton, from the United States Department of Agriculture, was the best of the introductions at Hawkesbury Agricultural College and Yanco Experiment Farm. It is a vigorous grower producing melons with a dark green skin and a fine, dense, scarlet red flesh. It has good resistance to mildew and anthracnose, and is a good carrier.

Others worthy of further testing were Fairfax; Congo; Ironsides; Kleckleys No. 6 wilt resistant; and Klondike R7 dark green wilt resistant; all from the U.S.A.

Cucumber.—Foremost SL 1, from the U.S.A. was promising at Hawkesbury Agricultural College. It produced an excellent vine growth, high quality fruit, dark green with white spines. Yield was very good and colour was held for a long time.

Beetroot.

The best of the introduced varieties at Hawkesbury Agricultural College and Yanco Experiment Farm was Feltham Globe, from England. It is a slightly flattened globe, externally a medium dark red and internally a deep scarlet. It has a fine texture, has no white rings, and yields well. Yates Topmarket also performed well.

In preliminary work in the Taree district three varieties of fodder beet were sown, and some roots were kept for seed production.

Cabbage.

A trial of sixty-three varieties was conducted at Bathurst Experiment Farm. Among the best were Yates Jubilee Hybrid and Yates Sugarloaf, from Sydney; Medium Copenhagen, from U.S.A.; and Friends Hybrid D, from North Ryde, N.S.W.

At Hawkesbury Agricultural College and Yanco Experiment Farm, Badger Market, Resistant Glory and Medium Copenhagen, all from the U.S.A., gave best results.

Cauliflower.

Of seventy varieties tested at Bathurst Experiment Farm, Eggins Early Market, from Sydney, did best. Other good lines were Friend's Erfurt Nos. 1, 4 and 20, Codania 101, from Denmark; and Deepheart, from Sydney. An interesting introduction was Pua Kea, from Hawaii. This produced a good texture curd in six weeks.

Brussels Sprouts.

Of eight varieties in a trial at Bathurst Experiment Farm Long Island Improved, from U.S.A., stood out because of its good yield of very firm, uniform sprouts closely packed on the stem. Grower strains 1A and 7A also performed well.

Sprouting Broccoli.

Thirteen varieties of sprouting broccoli were compared in a trial at Bathurst Experiment Farm. Ferry Morse Early, from U.S.A., was outstanding while Anderson's Green Sprouting and Waltham 29, from U.S.A., were quite good.

Lettuce.

Nine introductions were tested at Hawkesbury Agricultural College and Yanco Experiment Farm. Great Lakes No. 54, from U.S.A., was the best. It has fine frilled leaves giving good protection to medium sized heads, and has good resistance to tipburn. Prospect No. 77 from Rumseys Seeds, Parramatta, was promising.

Sweet Potatoes.

Seed of the variety HES 107 introduced from Hawaii was on trial at Grafton Experiment Farm. A batch of forty-three seedlings was selected down to six. Some of these produced remarkable results. One plant yielded 857 tubers weighing 144 lb. and the average yield of the six plants was 65 lb. They will be further tested next season.

Carrots.

Six introductions were sown, with four established varieties, at Yanco Experiment Farm. Chantenay Canner 0604 from the U.S.A. was outstanding for canning because of its deep, orange red colour and excellent quality. Giant Chantenay, from France, was promising as a market garden variety because of its strong green tops and tender, well formed root.

Soil Conditioners and Organic Chemicals.

Proprietary soil conditioners were further tested at Hawkesbury Agricultural College and Yanco Experiment Farm. In general, the better known brands produced the results claimed for them but some had no effect on soil structure or water absorption and one depressed seed germination. One increased yields, but this was almost certainly due to its high fertiliser content rather than soil conditioning capacity.

The experience of this Department has been that for commercial vegetable growing, soil conditioners are not an economic proposition, but this may not apply to a nursery area.

Pastures.

Rapid Increase in Sown Pasture.—The rapid increase in area of sown pastures, reported last year, has continued. The most recent factual figures are for the twelve months ended 31st March, 1954. One million acres were sown, bringing the total area of sown pastures in New South Wales to 6,015,000 acres. Subsequent figures may show a decline in that rate of expansion, due to higher prices for pasture seeds and the unfavourable 1954 conditions for sowing. Even so, some district agronomists have reported that pasture seed sales in their districts have continued to increase.

The trend, mentioned in last year's report, of farmers in the higher rainfall areas to replace repeated annual pastures of the Wimmera rye-subterranean clover type with perennial pasture has continued. It has caused a greater demand for *Phalaris*. Lucerne, less prominent during the recent sequence of good seasons, is again being widely sown for grazing purposes and more frequently used in mixtures.

Almost every district agronomist reports that the major part of his extension work is in connection with pastures.

Pasture Seed Production Increases.—The upward trend in local production of pasture seeds, interrupted by the unfavourable 1953 spring, was again apparent. This trend is correlated with a large increase in seed being handled in country districts and not passing through recognised clearing plants.

The greatest increase was in subterranean clover seed, of which the production increased to some 1,100 tons of Certified seed as against 500 tons for the preceding year. The production of *Phalaris* Certified seed was also double that of 1953-54, whilst very considerable quantities of uncertified *Phalaris* and of lucerne, wimmera rye and paspalum were harvested.

Research "Team Approach".—A research "team approach" is a notable development in pasture investigations. Very close co-operation has developed between officers of the pasture section of the Division of Plant Industry and officers of the Chemist Branch and Biological Branch of the Division of Science Services. This is especially so in relation to pastures in problem areas, e.g., Walcha, Capertee, Goulburn and Berry Districts. Excellent results are being derived from the field trials and associated laboratory work. Plans are in hand to extend the co-operative investigations to the granitic soils of the Bega-Moruya area.

Co-operation With Other Organisations.—The Coastal Pastures Research Committee comprised of representatives of the Department of Agriculture, University of Sydney and the C.S.I.R.O. functioned successfully. Joint publications and practical field recommendations have been derived from the work of the University/Department of Agriculture Research Team at Lismore.

Co-operative trials with the C.S.I.R.O., of *Phalaris*, cocksfoot and medics continued at Wagga, Condobolin and Temora Experiment Farms. A subterranean clover conference was held at Canberra to discuss problems and programmes. A Yanco conference between the Department of Agriculture and the C.S.I.R.O. considered research programmes for irrigated pastures. The Department and C.S.I.R.O. are co-operating in a grazing trial at Trangie Experiment Station.

The Department had the active co-operation of private firms in many pasture matters, including trials of chemical herbicides and rock phosphate fertilisers.

Pasture Investigations at the Colleges and Experiment Farms.

The volume and range of these projects remained approximately the same as in the previous year, but many of them have not made good progress, because of staff shortages, and in effect are temporarily curtailed.

Sulphur Response.—A very pronounced sulphur response occurred in lucerne on a basalt soil type at New England Experiment Farm.

Sown Pasture Protein Yield.—Sown pastures gave five times the protein yield of adjoining native pastures at Shannon Vale Nutrition Station.

Nitrogen in Winter and Spring.—At Berry, in the Illawarra, the use of nitrogenous fertilisers in winter and early spring gave yield increases of 17 cwt. of green pasturage for each cwt. of sulphate of ammonia applied. This response was obtained without damage to the legume content of the pasture.

Pasture-Rice Rotation.—The rice rotation experiment at Yanco continued to give interesting contrasts in rice yield, varying from 3.17 tons per acre to 1.78 tons per acre, depending on the cropping-pasture sequence.

Molybdenum Response in Cumberland County.—Hawkesbury Agricultural College has demonstrated molybdenum responses in County of Cumberland.

The agronomist (plant nutrition) at Hawkesbury College also finds that calcium hydroxide in excess of a 1 : 4 ratio in mixture with acid superphosphate may reduce the availability of phosphorus when lime and superphosphate mixtures are used in pasture establishment.

Summer Species Trials on the Far North Coast.—At Grafton Experiment Farm pleasing progress is being made in species testing and seed increase in respect of summer growing grasses and summer legumes. Large scale trials have been sown. Provision has been made for commercial herds, to permit practical grazing management of the pasture trial areas.

At Wollongbar Experiment Farm a programme of dairy nutrition research has commenced. It calls for a pasture agronomist, for field work relating to pasture management. The Division has now been able to appoint an agronomist for the purpose and other investigations of pastures, fodders and fibres at this centre.

Fat Lambs and Beef on Irrigated Pasture.—Emphasis at Leeton Experiment Farm continued to be on fat lamb raising and beef cattle problems in the M.I.A.

Grazing Lucerne, in the West.—At Condobolin Experiment Farm the successful establishment of large acreages of grazing lucerne is noteworthy.

Successful establishment and seed production of Giant Panic grass (*Panicum antidotale*) is also reported for that Farm.

Species Nursery.—At Bathurst Experiment Farm the species nurseries have been maintained. The mother plant bases of a number of useful *Phalaris tuberosa* strains have been carried on, for seed production.

Grazing Trials of Subterranean Clover Varieties.—Pasture investigations at Temora Experiment Farm include sheep grazing trials of subterranean clover varieties.

Volunteer pasture, subterranean clover pasture, and lucerne are also under grazing comparisons.

Introductions, Testing and Seed Increase.—Grafton, Glen Innes, Bathurst, Yanco and other Experiment Farms are testing introduced species of pasture plants. This species work and seed increases will be intensified as staff and facilities permit.

Pasture Work in Agronomists' Districts.

Natural Pastures.—These made an exceptionally heavy contribution to summer feed on the north coast. Considerable areas in other districts are being top-dressed or else replaced by improved pastures. Reduction of rabbit population has done much to prevent decrease of desirable natural pasture species. There is, however, continued spread of undesirable fibrous and tussocky grasses.

Improved Pastures.—One of the major features in the report of almost every district agronomist is the continued expansion of pasture improvement and the amount of extension time called for by that phase of agriculture. The reports are supported by figures showing increased pasture seed sales over most of New South Wales. The extremely wet autumn conditions on the coast, however, inevitably decreased the rate of sowing of improved pastures in affected areas.

Marked increase in popularity of *Phalaris tuberosa*, particularly in the coastal areas, and increased preference for Bacehus Marsh subterranean clover due to continued rust attack on the Mt. Barker strain, were noted. Popularity of lucerne continued. Farmers are growing it increasingly for their own use as well as a hay crop for cash returns.

Trials and Demonstrations.—Pasture trials and demonstrations were designed to assist extension officers in publicising the advantages of pasture improvement in their particular districts. Trials are mainly of a "pilot" nature, to extend the territory or usage of a practice already proven in another area. Many special trials under divergent environmental conditions are also conducted by district agronomists.

There is a growing feeling that district agronomists may conduct factorial trials designed to solve basic questions on establishment, liming rates, fertiliser rates, etc. Following the lines of the trials laid down by the Plant Nutrition Research Group, four such trials designed for direct extension have been laid down by the Goulburn district agronomist. These will be somewhat of a "test" case.

In collaboration with the Chemist Branch and the plant nutrition officer at Hawkesbury Agricultural College, investigations are being continued on Pilliga district soils.



Quality from Certified Seed Schemes.

The increase in pasture sowings, a further 1,000,000 acres in 1954, has expanded the seed trade.

Inspectors are giving attention to new vendors in particular, advising them of their responsibilities under the Agricultural Seeds Act.

Extension Survey of Minor Element Trials.—A co-operative team including personnel from the Department's Chemist's Branch, and the C.S.I.R.O., with the respective district agronomist, surveyed some ninety trials in eighteen agronomists' districts. Approximately 4,000 miles were travelled and the survey extended from the Queensland to the Victorian border and as far westward as Inverell, Gunnedah, Dubbo and Wagga.

This survey yielded a much more clear picture of the minor element deficiencies in N.S.W. pastures. A more definite approach to research problems can now be made.

There were fifty-four positive responses to superphosphate; eleven to molybdenum, and twenty-three to lime applications at varying rates. Very dry seasonal conditions in many areas restricted the growth of indicator plants and it is felt that a further survey during the spring of 1955, when growth conditions will have been much more favourable, will further clarify the minor element picture for N.S.W.

Reports on district agronomists' trials indicate that molybdenum is the only minor element of widespread deficiency. There are, however, isolated reports of other responses from agronomists' trials, e.g., copper in the Grafton area, zinc on heavy soils in the Leeton district, and magnesium on white sandy soils in the Leeton district.

Rhizobia Inoculations.—Many trials and commercial sowings of inoculated clover, particularly in coastal districts, were unsuccessful. The failures were attributed to a variety of causes, including lack of or untimely moisture, incorrect technique of inoculation, and questionable quality of peat inoculum. Reports from district agronomists indicate that inoculation troubles are not likely to be so apparent this year, because of the more favourable season and rectification of the other faults previously mentioned. Considerable publicity has been extended to farmers, on techniques essential to good inoculation.

Superphosphate Trend.—Most sections of the State, including the mid-west, report the increased use of superphosphate. Nearly every trial laid down by district officers indicates a response to it.

In coastal and tableland areas considerable quantities of Molybdenum superphosphate have been used, particularly at establishment, and on the north coast special mixtures of "neutralised" superphosphate are in common usage.

Pasture Management.—Agronomists in the coastal, tablelands and south-western areas see abundant evidence of the need for more efficient pasture management but consider that even in the past year a considerable advance has occurred.

Many requests have been received from farmers for detailed plans of more complete rotations, subdivisional fencing, farm water supply development, and the use of electric fences. The increase of undesirable species such as red grass in more inland areas and carpet grass on the coast has made many farmers "pasture management" conscious.

Agricultural Extension Grant Pasture Demonstrations.—Under the Commonwealth Agricultural Extension Grant 103 pasture demonstrations have been laid down to demonstrate to farmers particular advantages to be obtained from proven pasture techniques.

Weed Control.

Increased emphasis on the menace of serrated tussock on the central and southern tablelands has been a special feature of the year. The weed has spread rapidly. New areas have been located on the far south coast, in the central tablelands north of Wombeyan Caves, along the Macquarie River, in the Turon Shire.

Agricultural Extension Grant Demonstrations of the value of improved pastures for serrated tussock control on cultivable land have impressed farmers. Eighteen main demonstrations and six supplementary demonstrations of that type have been established.

General Extension Work.—Advice on weed control in general has been provided by the weeds specialist and district agronomists to farmers, home gardeners, manufacturers and Local Government Councils. Information on research results has been forwarded to a number of overseas and inter-State research workers.

Posters drawing attention to serrated tussock have been distributed throughout the affected areas. A 16-mm. cine film on this weed and its control and another on skeleton weed are in course of contract production.

The Mobile Spray Unit has also laid down in many parts of the State demonstrations of the use of modern herbicides for control of numerous weeds.

Grants to Local Government Bodies.—Twenty thousand pounds was made available again by the Department of Local Government to assist Councils in noxious plant control. It is required that Councils shall supplement on £-for-£ basis an allocation from this fund. On recommendations approved by the Minister for Agriculture and Food Production, the grant was distributed as follows:—Thirteen thousand two hundred pounds to eight Weeds County Councils; £6,250 to twenty-nine Shires; and £550 to five Municipalities.

Weed Conference.—A conference of officers concerned with weed control, from all States of the Commonwealth and a number of private firms, was held at Adelaide and attended by two officers of this Department. The discussions, covering the full range of weed control, were valuable in the exchange of weed research results and information in general. Recommendations to N.S.W. farmers have been modified as a result of the information gained in respect of a number of weeds.

Individual Weeds.

Serrated Tussock (*Nasella trichotoma*).—In addition to the aforementioned demonstrations further herbicides research is proceeding. The best results are from T.C.A. Further aspects of pasture control of tussock are being studied by Bathurst Experiment Farm. A two-day conference of relevant Departmental officers was held in the Western Region, at Orange, to discuss further actions.

Crofton Weed (*Eupatorium adenophorum*).—The stem gall fly parasite has spread rapidly on the far north coast and is now well established. In places the seeding of Crofton weed is reduced by 95 per cent. However, Crofton weed is spreading rapidly on the central coast, where the establishment of stem gall fly has been very slow. A fungal disease caused by a species of *Cercospora* has defoliated Crofton weed in the Murwillumbah area.

Bathurst Burr (*Xanthium spinosum*).—The season favoured heavy infestations by Bathurst Burr, particularly in the north-west and in southern irrigation areas. Spraying with 2, 4-D was extensively adopted in the north-west but much less in the south-west, where results were often indifferent because inadequate herbicide was applied.

Mint Weed (*Salvia reflexa*).—This weed spread further in the Coolah district, mainly due to destruction of grasses by grasshoppers followed by good rains for the growth of the weed. Expansion of pasture improvement in the affected areas is essential for control.

Fireweed (*Senecio latus*).—It continued to spread on the central and far north coast. There is evidence that pasture improvement, subdivision, controlled grazing, and regular mowing will do much to control this weed. Herbicide trials at Maitland have shown satisfactory control with 12 oz. of 2,4-D ester per acre, applied in the late autumn.

Thistles.—Thistle problems in improved pastures have rapidly increased, but research has shown that most can be controlled readily with small applications of 2,4-D. About 10,000 acres of thistles in the M.I.A. have been sprayed in recent months. Other areas, on the southern tablelands and in the southern irrigation districts are moving in the same direction.

Common Heliotrope (*Heliotropium europaeum*).—This plant has been most widespread in the M.I.A. and the central western section of the wheat belt during the past season, and been responsible for certain sheep diseases. Herbicidal control has not proved practicable. Long-term control is likely to be based on a general improvement in farm management and provision of alternate feed for stock.

Weeds in Crops, Control Trends.—Weed control in maize crops by spraying has been achieved in Windsor district by several growers, and the practice is likely to become more widespread.

Bearded millet in rice crops at Wakool is yielding to the adoption of longer rotations and the use of larger areas of improved pastures on the rice farms.

Trials at Gosford have shown a useful degree of control of weeds in strawberries by hormone herbicides. This may well lead to simplified commercial production of strawberries.

Promising control of weeds in lucerne with DNBP, and control of a rush (*Juncus polyanthemos*) with 2,4-D, are other interesting trends.

Use of Defoliants.—Farmer interest has increased in the use of defoliants for the direct harvesting of lucerne seed. Several areas have been sprayed experimentally, with satisfactory results. This new field for the application of chemicals in agriculture is likely to expand rapidly.

Acknowledgment of Herbicide Gifts.—Acknowledgement of gifts of chemicals from the following firms for herbicide research is recorded:—

Agricultural Services Pty. Ltd.; Drug Houses of Australia (N.S.W.), Pty. Ltd.; Dow Chemical Co. (U.S.A.); Imperial Chemical Industries of Australia and New Zealand Ltd.; Mobile Industrial Equipment Pty. Ltd.; Monsanto Chemicals Pty. Ltd.; Shell Co. of Aust. Ltd.; Swift & Co. Ltd.; Timbrol Ltd.; and Vacuum Oil Co. Pty. Ltd.

Aircraft in Agriculture.

Aircraft have been used more extensively for the application of herbicides and fertilisers during the last year. The number of aircraft operating is increasing. Some aircraft specially designed for agricultural use are in action and further expansion of the types is expected to occur shortly.

The distribution from the air of herbicides in very low volumes of oil, as a carrier, has proved very effective. This is helping to reduce the costs of aircraft application.

Aerial sowing and top-dressing of pastures is practised to a limited degree, mainly in the northern and southern tableland areas. Most district officers believe that there is considerable scope for expansion, provided that improved aircraft types, better bulk handling of the superphosphate on the ground and possibly a superphosphate with a higher phosphate content, are developed.

Seed Testing Laboratory.

The laboratory staff establishment was increased from seven to eleven to cope with demand for services. For the same reason a seed testing annexe has been established at the Botanic Gardens, with four of the staff located there. However, owing to staff losses, the staff has never been at the approved numerical strength. This, and the non-arrival of additional equipment have handicapped the work of the Seed Testing Laboratory.

Further demands for seed testing services are anticipated and it is desirable in any case that additional service shall be initiated, because of evidence of deterioration in the quality of some agricultural seeds being offered for sale, particularly in country districts. It would be desirable to request seed vendors and farmers to submit samples for testing but this would not be practicable at present.

It is notable that, because of the great volume of work from the various seed certification schemes, growers and harvesters of Certified seed are receiving a service which cannot be given to growers and harvesters of the no less important uncertified seed.

Seed Testing Statistics.—The growth of demand for testing is indicated by statistics:—

The number of samples received for testing in 1954-55 was more than 100 per cent. greater than in 1950-51, and 33 per cent. greater than in 1953-54.

The number of Certified samples has increased by more than 300 per cent. since 1950-51, and by 65 per cent. since 1953-54.

The number of samples tested under the Agricultural Seeds Act and the Stock Foods and Medicines Act increased by more than 100 per cent. since 1950-51. It was possible to handle the samples in this group only by using the seeds inspector in the mechanics of the tests.

Value of Seed Tested.—It is estimated that the samples examined this year by the Seed Testing Laboratory represented commercial parcels of seed to a total value of £1,000,000. The average value of tested parcels of certified clover seed is estimated at £2,000.

The increased work arising from the Stock Foods and Medicines Act, mainly because of the greatly increased grain imports from Queensland, led to the appointment of an additional seeds inspector. Also, because of the growth of the pasture seed certification schemes a second seed certification officer was appointed to the Southern Region, Wagga.

Pasture Seed Certifications.—Certified subterranean clover seed produced in 1954-55 showed an increase of 100 per cent. over the production of 1953-54; 1,100 tons were produced, mainly in the Wagga region. There are indications of further increases in 1955-56 and that it will extend to other areas.

The number of growers seeking to participate in the *Phalaris* seed certification scheme also underwent a big increase; over 12 tons of seed were certified.

More Seed Vendors.—The increase in pasture sowings has expanded the seed trade, and many more firms are handling seed in addition to their former goods and services. In some cases the staff of the respective firm is not sufficiently familiar with the commodity to ensure that the seed conforms to standards required by the Agricultural Seeds Act. Inspectors have given special attention to this type of seed vendor, to educate them in their responsibilities under the Act and to get their co-operation towards ensuring that only seed of good quality is distributed.

Legal Actions under the Agricultural Seeds Act.—One wholesale merchant was successfully prosecuted under the Act. Legal action is pending in four other cases of infringement of the Act. Several warnings for minor breaches of the Act were also issued.

Irrigation.

For some years the special agronomist (irrigation) has also had the duties of Land Settlement Officer. Due to a pronounced increase in the War Service Land Settlement work his activities in the irrigation field have been severely handicapped.

However, by a lot of correspondence and personal contact with farmers and others, considerable advice has been extended concerning irrigation plants and methods. The very wet year has given rise to many calls for advice on drainage problems.

Hunter Valley Conservation Trust.—The special agronomist (irrigation), Mr. E. W. Bowmaker, was appointed to the Trust as the Minister's representative on the 31st August, 1954, in place of Mr. P. F. Stanton (resigned). He attended nine meetings of the Trust. For details, reference should be made to the Annual Report, Hunter Valley Conservation Trust.

Drainage Act Conferences.—Representations by the Minister for Agriculture and Food Production to the Department of Public Works, which administers the Drainage Act, led to an inter-Departmental committee in which the special agronomist (irrigation) represented this Department. The committee reviewed the legislation in regard to formation and operation of drainage unions and trusts, and foresees a number of amendments of the Act. The committee's report is withheld pending the outcome of legislation suggested by the more recently appointed Committee of Advice on Flood Mitigation and Control.

Board Constituted Under the Water Act.—The special agronomist (irrigation) was appointed a member of this Board. The meeting this year concerned the excision of lands from the Darling Anabranch Water Trust District.

Macleay County Council Flood Mitigation Committee.—The Macleay County Council expanded its activities from an electrical undertaking, to include Macleay Valley flood mitigation under the provisions of the Local Government Act. Under that Act the Council may co-opt persons to assist. Officers of the Public Works Department, Soil Conservation Commission, and Department of Agriculture have been co-opted. The special agronomist (irrigation) represents this Department.

Wakool Land Use Committee.—The Department is represented in this Committee by the Deniliquin and Barham district agronomists. For certain meetings the special agronomist (irrigation) represents the Department. He attended two meetings this year.

One of the meetings was concerned with the extension of the committee's activities into the newly opened Deniboota and the Deninein Irrigation Districts, as suggested by both the Minister for Agriculture and Food Production and the Minister for Conservation.

The Department continued close co-operation with landholders and other contributing bodies in demonstrations and experiments sponsored by the committee.

Blowering Dam Committee.—This committee, comprised of representatives of the W.C. & I.C., the Department of Lands, Rural Bank, and Department of Agriculture, met to review soil and contour surveys of the proposed Billabidgee Irrigation Scheme. The Department of Agriculture furnished a report concerning the potentiality of a number of soil types for horticulture.

Abermusden Committee.—This committee, appointed to consider utilisations of Hunter Valley irrigation water to be stored by the Glenbawn Dam, held two meetings. Figures were available as to the cost of water to landholders under five separate schemes of reticulation. No decision was made as to which scheme should be adopted. A tour of the valley projected for April, 1955, to inspect several irrigated properties was postponed in the light of the disastrous Hunter Valley floods.

Deniboota Irrigation District.—On completion and opening of the Lawson Syphon which conveys the Mulwala Canal water beneath the Edward River, the Deniboota District was partially



"Water for the taking."

To irrigate his demonstration dairy pastures from water stored on the farm, Mr. C. Scrivener, Cootamundra district, is pumping from an adjacent, intermittent stream whilst the stream is running.

(Photo from Wagga Office.)

opened for irrigation in 1955. The special agronomist (irrigation) assisted the W.C. & I.C. in a determination concerning rice growing in this District.

Committee on Flood Mitigation and Control.—Following the floods in the Hunter, Macquarie and other rivers early in 1955, Parliament appointed a special committee to report on flood mitigation and control in all rivers liable to flooding. A representative of this Department was appointed to the committee.

Already the committee has surveyed the Hunter Valley requirements and submitted two interim reports indicating short term measures which, however, would form part of a long range programme.

Irrigation Equipment Firms.—Contacts have been maintained with manufacturers of spray irrigation equipment and the newly developed plastic pipes.

Farm Water Supplies Branch, W.C. & I.C.—In the agricultural matters relating to the design and use of spray irrigation plants there is very close co-operation between this organisation and the Department of Agriculture. This Department reports on the economic potentialities of spray irrigation proposals when applications are made by landholders to the W.C. & I.C. Branch under the Farm Water Supplies Act.

Farm Water Storage and Spray Irrigation.—In view of the great interest in farm water storage and spray irrigation, a scheme is under way in co-operation with the Commonwealth Trading Bank to establish in certain coastal districts a number of demonstrations of the requirements.

War Service Land Settlement.

The special agronomist (irrigation) has also been handling this section of Plant Industry Division's responsibilities. The latter six months of 1954-55 saw a great increase in this field. An indication of that is in the following:—

116 cases of promotion of new estates for the period 1st January to 30th June, 1955, as compared to 68 for the previous six months—total 184.

In the twelve months sixteen reports on estates for acquisition were requested.

In view of the recent special loan agreement between Commonwealth and States whereby the Commonwealth will allot £2 for each £1 expended by the State, a further increase in this activity is inevitable. Accordingly the Department is arranging for the re-appointment of an officer for full time War Service Land Settlement duties.

For the period from inception of War Service Land Settlement to the 31st May, 1955, the following statistics are of interest:—

Promotion Cases.—2,145 applications received and, of these, 510 estates established by 1,146 settlers. The area of the estates is approximately 1,351,358 acres.

Acquired Estates.—123 estates resumed or purchased, an approximate area of 1,284,224 acres. The ninety-five estates settled have been allotted to 944 settlers.

Close co-operation has been maintained in particular with the Closer Settlement Advisory Boards, Department of Lands, in inspections of estates for settlement. The district surveyors, Department of Lands, and district officers of the Department of Agriculture have co-operated closely in the actual settlement of blocks. The Department's agricultural extension services have been keenly used by the settlers.

Tullakool Irrigation Area.—A special inter-Departmental Committee was appointed by the Minister for Conservation to inquire into the settlement on Tullakool Irrigation Area. The committee comprises representatives of the Rural Bank of New South Wales, the Water Conservation and Irrigation Commission and the Department of Agriculture (land settlement officer). They commenced enquiries in August, 1954, and interviewed all settlers concerned as well as local officers of the respective Departments. The problem of the unsatisfactory financial position of these settlers has now been subject of a first, interim report to the Minister for Conservation.

"Co-operative Machinery" for Langtry Park Estate.—A special conference was held between No. 3 Closer Settlement Advisory Board and the settlers on the recently allotted Warragundra and Langtry Park Estates.

For some years the W.C. & I.C., by arrangement with the Closer Settlement Advisory Boards, has prepared the land and sown the pasture areas on irrigated dairy farms in the irrigation districts.

The settlers on Langtry Park Estate applied for supply of a composite farming plant which would enable them co-operatively to carry out their own developmental work. After full consideration the Boards have agreed to supply the machinery.

The settlers on Warragundra preferred to have their work done by the W.C. & I.C.

These two estates, having commenced at the same period, will provide a reasonable guide to the more economical system.

Kooba Estate, Whitton.—The Department joined in a conference with the W.C. & I.C., the Closer Settlement Boards and the Rural Bank in respect of development of the newly acquired Kooba Estate at Whitton. Ultimately this will be an extension of the Murrumbidgee Irrigation Areas. A full report on this conference has been submitted by the W.C. & I.C.

Rural Electricity Advisory Service.

The rural electricity officer attached to the Department of Agriculture was unable to fulfil much advisory service this year. Most of his service was directly for the Electricity Authority, by arrangement. His attention to mail enquiries was the major contribution to the Department of Agriculture rural electricity advisory service.

The officer was engaged for most of the first half of the year in preliminaries to a rural electricity survey of voltage and demand conditions on farms, for the Electricity Authority. In December, 1954, the rural electricity officer resigned from the Public Service to accept an appointment by the Electricity Commission of New South Wales.

He is now on the staff of the Electricity Commission and working in the office of the Electricity Authority, on the aforementioned survey. He visits the Department of Agriculture to attend to rural electricity enquiries.

DIVISION OF HORTICULTURE.

Regulatory Work.

QUARANTINE SERVICES.

Importation of overseas plants and plant products were examined for the Commonwealth Department of Health in accordance with the Quarantine Act. The inspections were effective.

Importation of Seeds.—Importations of seed were exceptionally heavy throughout the year. Shipments of grass seed, clover, and seed peas came from New Zealand, a wider range of vegetable seed from U.S.A., and flower seed from Holland and the United Kingdom. Insect infestation was found in some of those consignments, necessitating fumigation before release. Some grass seed consignments contained prohibited seed and/or noxious weed seeds. Those consignments were released to comply with import requirements.

Importation of Living Plants.—Plant importations were less frequent and in smaller quantity than for years past, due probably to conditions and restrictions placed on living plant importation under Commonwealth Nursery Stock Regulations. In one consignment of 2,000 plants from New Zealand, twenty-four *Cornus* plants were infected with eelworm and were destroyed.

Importation of Orchid Plants.—Orchid plants from many different countries, the United Kingdom, Hawaii, Holland, Brazil, India and New Guinea were imported in considerable quantities until 1.12.1954. At this date the Commonwealth Nursery Stock Regulations came into operation for the control, treatment and post-entry supervision. Importations immediately fell away sharply.

Importation of Bulbs, Corms and Tubers.—Bulbs were imported in record quantities and included 600,000 *Anemones* and 8,000 tuberous *Begonias* from New Zealand, 360,000 *Hyacinths* from Holland, and 40,000 *Liliums* from Japan. Mite infestation was found in consignments of *Hyacinth* and Japanese *Liliums*, all of which were fumigated before release. Importations of *Gladiolus* corms and *Dahlia* tubers were almost negligible, apparently due to the Commonwealth Nursery Stock Regulations.

Importation of Basketware.—Considerable trade in bamboo and rattan ware from Japan was built up. A number of these consignments showed mite and other insect infestation and were fumigated before release.

Parcel Post.—All overseas parcels subject to Commonwealth Plant Quarantine Regulations were examined at Parcels Post Office. Of 11,117 parcels and packets submitted for inspection, 4,244 (38 per cent.) were detained for treatment or destruction, as the case required.

Passengers Baggage.—Considerable plant material, seeds, fruit and other quarantinable articles were intercepted at the wharves in passengers' luggage from overseas, and either destroyed or subjected to control treatment.

Timber.—Importation of timber, sawn and in log form, amounted to approximately 190 million super feet, an increase of 49 million over the 1953-54 total, which was an all-time record. Sawn timber amounted to 172 million super feet, mainly Douglas Fir and other pine timber from North America. The balance was mainly pine from New Zealand and maple from Malaya. Log timber was mostly from Borneo, Indonesia and Malaya, almost entirely maple.

Insect infestation was extremely slight in this huge importation of timber. Pine weevil was found in some Klink pine from New Guinea, bark borer in North American sawn pine and borer infestation in logs from New Hebrides and New Guinea.

EXPORT INSPECTIONS.

Inspections under the Commerce (Trade Descriptions) Act were mainly of fresh fruit, flour and rice. The main exports of fresh fruits were oranges and apples, but small quantities of seasonal fruits were exported to the Pacific Islands.

Citrus.—Fifty-eight thousand cases of Navel oranges were exported through the Port of Sydney; about the same as last year's figure. Shipments commenced early in June and continued until mid-August. Most was forwarded to New Zealand, and the balance to Hong Kong and Singapore. Practically all was from the Murrumbidgee Irrigation Areas and, due to the light crop, was large and inclined to be coarse.

Diphenyl wraps almost eliminated loss due to mould. Rejections at shipside inspections amounted to 1,096 cases because of excess acid (early in the season), *Septoria* spot, and coarse thick skins.

Export of new season Valencia oranges commenced in mid-September. Approximately 52,000 cases were shipped. Most went to New Zealand, and 9,500 cases to Hong Kong and Singapore. All were grown in the M.I.A., and the small crop was reflected in the large fruit and inclination to coarseness.

A consignment of 567 cases of Mediterranean Sweet oranges from the M.I.A. in August was rejected at shipside inspection, for coarse skins and *Septoria* spot.

Several small consignments of lemons, totalling 3,000 cases, from coastal districts and the M.I.A. were presented for export. Quality was good but some cases were rejected, for verrucosis and muscel scale in coastal fruit and for red scale on M.I.A. fruit.

The standard of export pack by a minority of packing houses is less than desired. Surprisingly, this is more often encountered in Co-operative Packing establishments, a reflection on the grower management.

Pomes.—Because of the light apple crop, no shipments were made from this State to Europe, but consignments went to "Eastern" markets from July to mid-October, 1954. In this period 34,016 cases were exported to Singapore and Hong Kong, and 7,079 cases to Colombo. Most came from the western districts and the M.I.A., and were mainly Granny Smith. Larger fruit went to the "East" and the smaller fruit to Colombo. Rejections at shipside were heavy towards the end of the season, because of bitter pit, black spot, broken skins and bruising.

The pear crop was good but very little was exported, because of low prices in the United Kingdom. Careless handling, preparation, and packing, together with black spot, led to many rejections at shipside. Of 4,400 cases submitted for inspection 1,710 cases were rejected. The stringent spray residue regulations and the uncertainty of the fruit passing shipside inspection are affecting the export of pome fruits.

Grapes.—Fairly large quantities of Ohanez grapes were shipped to Singapore and Colombo. The quality and packing were very good. A consignment of 1,500 cases of Ohanez grapes grown in Victoria was submitted at Sydney Port for shipment to Colombo, and 600 were rejected for small deteriorated berries, black spot, and internal browning.

Flour and Rice.—Flour exported from Sydney amounted to 201,285 tons and was shipped mainly to Indonesia, Malaya, India, United Kingdom, Colombo and Pacific Islands. Monthly exports ranged from 7,214 tons up to 28,378 tons.

During January flour beetle infestation caused rejection of approximately 600 tons. Slight infestation was noticed in March. It increased until in April it was fairly general and caused heavy shipside rejections.

Export of rice totalled 25,000 tons, shipped mainly to the Pacific Islands. Small quantities went to New Zealand and the United Kingdom.

INTER-STATE SHIPMENTS.

Apples and pears from other States, discharged at the wharves for inspection, amounted to 265,522 cases in sixty-two shipments mostly from Tasmania. Condition on arrival was generally good, but severe russetting and black spot detracted greatly from the appearance of many consignments. A big percentage of the fruit was marked down to "Good" or "Domestic" grade.

Peanuts from Queensland discharged at the wharves for inspection consisted of eighty-nine different shipments. Most of the nuts intended for manufacturing purposes were insect infested, and 5,261 bags were fumigated before release.

Almonds and walnuts from South Australia totalled thirty-seven consignments. All were free of insect pests.

CITY MARKETS AND RETAIL INSPECTIONS.

Fruit Inspection, City Markets.—Regular fruit inspections were maintained in the City Markets. Two hundred and nine growers were warned and twelve were prosecuted for grading and topping offences.

Citrus.—Oranges were plentiful for most of the year. Navels from the M.I.A. were light in supply, large and rather loose-skinned but showing very little frost damage. Only a very small portion of M.I.A. Navel oranges came on to the market, as most were exported or sold direct to country centres and individual buyers. Navels from the Murray Valley and South Australia were of very good quality. They approximated 5,500 cases per week and lasted until October. Practically all new season Navels marketed in March, April and early May were from Queensland and the N.S.W. coastal districts. They were artificially coloured, pale yellow, with little flavour, coarse in texture, and immature. Texture and character improved greatly as the season progressed. Intermediate crop Navels from coastal districts were in much heavier supply than normal. Much of this fruit failed to meet the juice percentage required by the Citrus Grading Regulations. Action to enforce this requirement became necessary.

Main crop Valencias from coastal districts were in good supply but fruit from many orchards was extensively black spotted during the early summer. The intermediate or second crop was the heaviest for many years. It was of poor quality early but improved as the skin fined down and sugar content improved. Valencias from the M.I.A. marketed up till the New Year were good. Those held for later marketing deteriorated in colour and quality.

Stone Fruit.—Early cherries from Young were very small and, subsequently, badly rain damaged. Later consignments from both Young and Orange were of good quality, and extended into the New Year. Heavy supplies of reasonably good quality apricots, plums and peaches were marketed from coastal districts. Better quality fruit was received from inland districts. It was well graded and packed, but brown rot caused heavy loss.

Tropical Fruits.—Pineapples were in fair supply throughout the year. Blister disease caused many consignments to be reconditioned and eastaway certificates were given for large portions of many consignments during the summer. Bananas were scarce from early winter till November; and in that period the grading was mostly poor, due to undersized and immature fruit.

Tomatoes.—The market was well supplied with tomatoes, and no serious losses occurred from disease or waste. Victoria, Queensland and South Australia supplied the market with good quality fruit during the off season for local crops.

Potatoes.—One million two hundred and fifty thousand bags from inter-State and local sources were submitted for inspection. The majority was inter-State. N.S.W. potatoes amounted to 116,400 bags, and generally were not of the high quality of most of the inter-State consignments. Some 14,500 bags were withheld from sale for reconditioning before release to the trade; because of disease, breakdown, or mechanical injury. Tasmania contributed 674,000 bags and Victoria 308,000 bags,

of which 7,250 bags from Tasmania and 5,000 bags from Victoria were withheld from sale for reconditioning. Western Australia, Queensland and South Australia forwarded 151,600 bags. Wet rot caused some wastage in Western Australian consignments.

Fruit Shops and Barrows.—Inspection of City fruit shops and barrows was carried out when possible. Two barrowmen were convicted of "topping" and others were warned for similar offences.

Condemnations.—Fruit and vegetables condemned and destroyed by boiling at the Export and Import Branch were as follows:—For fruit fly and codling moth, 1,875 bushel and 1,762 half-bushel cases; for blight, grub and eelworm in potatoes, 625 bags.

DISTRICT AND SUBURBAN INSPECTIONAL WORK.

Fruit Fly.—Climatic conditions aided the breeding and spread of fruit fly. The pest damaged crops throughout New South Wales, along the coast, on the highlands and as far west as Broken Hill. In the Murrumbidgee Irrigation Areas, it was necessary to utilise the whole of the local horticultural staff and some officers from other districts to conduct an eradication campaign. This commenced on 16th March, 1955, and occupied inspectors' full time for three months. It was necessary to send notices to all growers in the M.I.A. and, in many cases, to make several inspections to ensure that all growers had complied with the notified directions.

The first recorded fruit fly catch in the Central Murray area was found recently at Barham. The horticultural staff along the Murray River has since conducted continuous inspections along the river and in adjacent districts. The fly infestation in the Murrumbidgee and Murray areas has had repercussions in that for the time being the New Zealand citrus export trade has been considerably curtailed. Under New Zealand quarantine regulations, citrus from the M.I.A. and from within a 50-mile radius of Murray River centres where fly has been found will not be accepted by New Zealand unless certain quarantine treatments are effected. At present, and until more is known of their effect on New South Wales citrus, such commodity treatments could not be advised.

The loss of the New Zealand market is seriously affecting the New South Wales citrus industry. Fruit normally exported to New Zealand is now being placed on New South Wales and Victorian markets.

During the fruit season calls were made from many centres for inspections in country towns to enforce the fruit fly regulations and to make backyard growers realise their obligations in the control of this pest. Shortage of staff made it impossible to respond to all these calls but many centres, including Broken Hill, Narromine, Dubbo, Forbes, Bourke, Tanworth and Hay, were inspected.

Citrus Gall Wasp.—The citrus gall wasp eradication campaign was carried over a four-month period and it was found that this pest had spread further than at first thought into suburban areas. It is impossible to determine the extent without close inspection in all suburbs. Two officers will be engaged on citrus gall inspections from July to September, 1955, inclusive.

District Potato Inspection.—Inspection of potatoes continued for the Potato Marketing Board and Certified Seed Potatoes Co-op. Ltd. Enforcement of the Potato Licensing Act by officers of this Division continued difficult.

Extension Campaigns.—Many demonstrations are given by horticultural officers in the course of ordinary duties but where growers in some districts appear to require intensive tuition, in a particular phase of fruitgrowing, district officers conduct campaigns accordingly. In the Gosford district emphasis has been placed on conversion and replanting of old citrus orchards; in Batlow, more efficient and economic spraying for pest and disease control; in the Cumberland area, improved orchard drainage; and at Young, the improvement of fruit quality in prunes.

General.

Committee of Enquiry—Mid-Murray Dried Fruit Area.—This Committee, appointed eighteen months ago to report upon actions to rehabilitate the Mid-Murray irrigation settlements, completed its investigations and submitted their report to the Commonwealth, New South Wales and Victorian Governments.

Advisory Committee—Fruit Cool Storage Investigations.—Two meetings were held to review and co-ordinate the co-operative work carried out by the C.S.I.R.O. Division of Food Preservation, and this Division of Horticulture. The co-

operative work includes the cool storage and quick freezing investigations at the C.S.I.R.O. Homebush Laboratory, the investigations at the Plant Physiology Laboratory, Botany Department, University of Sydney, and at the Gosford Citrus Wastage Research Laboratory. The committee associated with the latter is a sub-committee of the abovementioned Advisory Committee.

Advisory Committee—Fruit and Vegetable Processing Research.—A meeting of this committee reviewed all current investigational work in fruit and vegetable processing and planned future work. The committee studied reports on quality of citrus juices and decided to gather further information on the factors responsible for juice quality. Work on the storage and ripening of peaches and apricots for canning and freezing, the sulphuring of fruits for drying, and the processing of berry fruits for canning and freezing, will be conducted by the C.S.I.R.O. Division of Food Preservation and this Division.

Commonwealth Dried Fruits Processing Committee.—This committee is representative of New South Wales, Victoria and South Australia. It has an advisory role regarding technical aspects of the dried fruits industry. This year the committee considered a number of technical problems relating to stickiness in seeded lexiacs and to sulphate dipping of sultanias.

The committee also arranged for investigations into the possibilities of packing dessert prunes in a suitable type of small consumer package. The work being carried out by this Department and the C.S.I.R.O. Division of Food Preservation and Transport, involves a trial of various types of cellophane or transparent plastic film containers to hold a small quantity of processed prunes, and the testing of new methods to ensure satisfactory keeping quality and protection from mould.

Sixth Australian Canning Convention.—Representatives of growers, canners, technologists and others associated with the fruit and vegetable canning industry met in Adelaide in September, 1954, for the Sixth Australian Canning Convention. The Department has an active interest in these Conventions. An officer of the Division of Horticulture was convener.

New South Wales Canning Fruits Advisory Committee.—This committee was established by the canning industry to review continuously the requirements in canning fruit plantings. The committee is under the chairmanship of an officer of the Division of Horticulture, and is representative of canners and growers. A comprehensive review of the trend in peach plantings has been completed. The committee is now studying apricot and pear plantings.

Citrus Industry.

EXTENSION WORK AND TRENDS.

District fruit officers' advice and guidance in all aspects of citrus production and marketing were consistently sought by growers. Red scale control was subject of a sustained campaign, with good results where weather conditions were favourable. White wax scale in coastal districts was also subject to a campaign. Fertiliser programmes received attention, and in the Murrumbidgee Irrigation Areas new recommendations have been drawn up and publicised. Underground drainage in coastal districts, in the M.I.A., and on the soldier settlements at Coomealla, received special attention in terms of initial surveys and advisory service. In the M.I.A., where a special Tile Drainage Committee functions, considerable money is being expended on drainage.

Sustained pressure by field officers on the advantages of the *Phytophthora* root-rot resistant rootstock *Poncirus trifoliata* for localities favourable to this disease, and the special techniques for satisfactory propagation of trifoliata have shown further satisfactory results. Almost 100 per cent. of new plantings in the M.I.A. and an appreciable percentage in other districts have been on this stock.

Renovation and Alternative Land Use.—This problem, peculiar to the older citrus growing districts, is very important in coastal districts. Field officers' advice is continually sought and much time has been devoted to it. The post-war cutting up of larger orchards into uneconomic areas has accentuated the problem. Inexperienced persons who bought the uneconomic areas are now faced with the necessity to reconstruct.

Extension Service in Soldier Settlements.—District fruit officers have continued to act in committees formed to advise on the development of settlements at Coomealla and at Ellerslie in the Murray River areas. They have also maintained regular contact with individual settlers, to advise on horticultural problems as they arise.

Trends in the Citrus Industry.—The preference reported last year, for *Poncirus trifoliata* as a rootstock for oranges, has continued, but nurserymen have had difficulty in securing adequate supplies of suitable propagating material. The output of young trees on this stock has consequently been restricted. Growers' demands have not been met.

Climatic conditions in coastal districts favoured *Phytophthora* root-rot, and the condition of mature trees on the susceptible rough lemon rootstock further declined.

The grapefruit position has not improved. Growers in grapefruit suitable districts are apprehensive of the virus disease known as "Stem Pit". Investigations into this disease are particularly directed towards locating tolerant strains of grapefruit. This work is essentially of long-range character. Quick results are not expected.

Lemon growers are still reducing their areas. Very little planting occurred. Lemon prices were slightly better, due to a lighter crop, but not sufficient to inspire new plantings.

Pest control methods are changing in the inland citrus districts. Fumigation as a major method in the control of red scale is giving way to control by spraying because of labour difficulties and high equipment costs. White oil is the common spray material but growers are seeking alternative scaleicides because of the unfavourable effect of white oil on fruit colour and quality.

Smaller power spray plants, of 5 to 7 gallons per minute capacity, are being replaced by units with deliveries of 18 to 26 gallons per minute. Increasing growers are using towers on the spray plants, to secure more effective coverage of the tops.

CITRUS RESEARCH.

Wastage.—Sodium ortho-phenylphenate dip solution to control green mould wastage in oranges has now been recommended and is being used by co-operative citrus packing houses in the Gosford district. The original disadvantages, liability of fruit to rind injury and excessive shrivel, have been overcome by controlling the alkalinity of the solution and by rinsing the fruit with clean water after the treatment. Slightly better control of green mould can be obtained by eliminating the rinsing, and recent experiments indicate that this may be recommended shortly. The evidence suggests that, on elimination of rinsing, the sodium ortho-phenylphenate treatment will virtually guarantee freedom from green mould wastage.

The recommendation that diphenyl wraps should contain the minimum of 30 mgs. of diphenyl per 10-inch by 10-inch wrap has proved satisfactory under commercial conditions. Wraps impregnated with other chemicals, e.g., sodium ortho-phenylphenate, are under test. One special advantage of the latter wrap would be absence of odour.

Lemon Storage.—Orchard storage of main crop (winter) lemons for five to six months without fear of excessive loss due to stem-end rot is under investigation. Results so far indicate the importance of combining a field spray programme with a post-harvest dip of 2,4-D and salicylanilide.

Spore Load Investigations.—In view of the importance of the number of spores on the fruit skin, efforts are being made to determine the most satisfactory method of estimating the spore load.

Citrus Improvement Committee's Activities.—Experimental plantings are now highlighting the recommendations made by this committee several years ago, that careful attention be given to the selection of citrus budwood to avoid carrying virus infection into the new trees. At eight years of age some of the first plantings at Griffith Viticultural Nursery now show that trees on Washington Navel, from budwood selected according to the recommendations, have produced more than double the yield of trees from sealy butt infected budwood on trifoliata stocks.

Differential growth of the trees and yields are also marked in grapefruit at Yanco Experiment Farm. There it is also apparent, so far, that several seedling lemons can be worked satisfactorily to trifoliata. A contrast is provided by the standard varieties Eureka and Lisbon, which are unsatisfactory on trifoliata.

The main citrus improvement work is still scion selection for trifoliata, but scion selections for freedom from stem pit, mandarin decline, and other viruses are receiving increased attention.

Propagation and Citrus Improvement.—To advance investigations directed by the Citrus Improvement Committee and to implement further citrus experiments, 6,000 stocks were budded

at the Gosford Citrus Experiment Station during the year. In preparation for future work some 24,000 citrus seedlings were raised, and 15,000 citrus stocks were planted in nursery rows.

Rootstock Trials.—In a Murrumbidgee Irrigation Areas trial, Valencia oranges on Sweet Orange stock have improved to such an extent during the past season as to be equal in vigour and appearance to those on Rough Lemon stock.

At Narara, trees on Sweet Orange stock are also improving, and approaching the standards on Rough Lemon, although trees on the latter are, as yet, superior.

Preharvest Drop Sprays.—At Yanco Experiment Farm the latest results show that 2,4-D is the main stop-drop material. 2,4,5-TA and 2,4,5-TP gave similar control of drop, but at harvest an appreciably lower percentage of fruit that retained their buttons.

Gosford Citrus Experiment Station.—The first area of the Somersby section of the Gosford Citrus Experiment Station was prepared, by putting into operation the plans for surface drainage, under-drainage and construction of diversion banks. The initial citrus plantings of 655 trees were made and successfully established, with material propagated in the Citrus Improvement Committee's programme of work.

This planting is designed to (a) provide information on the influence of strains of trifoliata and trifoliata hybrids as stocks for Valencia and Navel oranges; (b) ascertain the relative merits of various stocks for *Phytophthora* root-rot resistance; (c) test selected strains of grapefruit for tolerance to the virus disease known as "stem pit"; (d) test the incidence of sealy butt virus in citrus varieties not yet tested.

Since orange propagations on trifoliata have been almost confined to the popular Navel and Valencia varieties, in experimental and commercial plantings, there is no sealy butt infection information relating to other orange varieties. Some of these may assume commercial importance in the future. Hence the work under (d), above.

Five more acres have been prepared for planting to citrus in the spring of 1955, and 7 acres of virgin land have been surveyed and are being cleared for subsequent planting. In addition, underground draining has been carried out in a further 10 acres of old land, a basic operation for subsequent development as a site of experimental plantings.

Narara Section.—This section of the Gosford Station is largely devoted to propagation work, but investigations and field trials are also undertaken there. The collection of citrus varieties maintained in an arboretum was increased by seven this year.

A block of parent trees is maintained at Narara Section for the Citrus Bud Selection Society of N.S.W. A parent tree collection for Departmental use is being developed and twenty-eight trees were added.

A *Phytophthora* root-rot trial of four rootstocks, and a total of eighty trees, was planted and successfully established.

A commercial block of 115 citrus trees was planted for use by the district entomologist.

Yanco Experiment Farm.—Existing citrus plantings have been maintained, under difficulty occasioned by inadequate irrigation equipment. Fortunately, suitable irrigation facilities are being developed. The work, undertaken by the W.C. & I.C., is expected to be complete in the spring of 1955. This will permit more efficient irrigation of citrus plantings in the new horticultural area, which have an important role in the citrus improvement programme.

Citrus plantings in the old orchard at Yanco are used for experimental projects including oil spray effects on fruit quality, influence of lime and phosphate on fruit quality, and influence of lead arsenate and phosphate on fruit maturity.

Coomecalla Horticultural Research Station.—Good progress has been made in developing this Station. Essential buildings, such as an administrative block, workshop and machinery shed, and fuel store, are complete. An area of 150 acres has been securely fenced and 13 acres have been cleared. The clearing of another 22 acres and the ripping of 33 acres are proceeding.

A contract has been accepted for the supply and installation of a domestic water supply and an irrigation system. The work is expected to be completed in time to permit initial plantings of citrus in the spring of 1955. The W.C. & I.C. is constructing an underground tank, of 100,000 gallons, and the work has reached an advanced stage. Electricity has been connected to the Station to serve buildings and pump sites.

Lecton Experiment Farm.—The small planting of Valencia oranges has been maintained for pedigree bud supply and for pest control investigations.

Griffith Viticultural Nursery.—Experimental citrus plantings have been maintained at a satisfactory level. They are yielding valuable information on the trifoliata root-stock problems, including stock strain influence and scaly butt virus, and in the evaluation of new citrus varieties.

N.S.W. Co-operative Bud Selection Society.—As in previous years, the Society has been assisted to advance the Parent Tree Registration Scheme inaugurated in 1953. The assistance consisted of necessary inspection of nominated trees and the location of bud supply sources. Trees maintained at the Gosford Citrus Experiment Station by the Society failed to yield an appreciable quantity of buds, the result of dry conditions at crucial periods.

Exchange of Citrus Plants and Seeds.—Budwood of Navel and Valencia oranges free from the virus disease scaly butt, and seed of a selection of *Poncirus trifoliata* were forwarded by request to the Subtropical Horticultural Research Station at Nelspruit, South Africa. Nucellar lemon varieties and Troyer Citrange imported last year from U.S.A. have been released from quarantine and transferred to the Gosford Citrus Experiment Station.

Banana and Other Tropical Fruit Industry.

Climatic conditions provided one of the best growing years on record for bananas. However, the conditions also favoured pests and diseases which largely offset the benefits. An early forecast of this winter's production potential has been reduced appreciably.

Production for the year was considerably in excess of the 1953/54 yields. Some 2,161,126 cases were marketed from 24,102 bearing acres, an average of 89.6 cases per acre. Prices were firm up to November but fell away as summer supplies increased. February floods disorganised transport to the southern markets, and thousands of cases of fruit were lost. The record acreage of 30,144 in New South Wales and some 14,000 in Queensland, threaten a forthcoming serious test of the capacity of distribution and marketing organisations to ensure payable prices to growers.

Banana Growers' Federation.—The Department has enjoyed the complete co-operation of the Banana Growers' Federation. This society has contributed generously to disease and pest control, research and demonstrational work at the Duranbah Experiment Plot, and to extension work—particularly at district field days.

Extensive Service in the Banana Industry.—The 9th Annual Field Day was held at Duranbah Experiment Plot in disappointing weather, but still drew a large attendance of growers from many localities. Many growers visited the Duranbah Plot, throughout the year, for personal guidance in their plantation problems.

The Duranbah Plot figures for production, and marketing costs, were recorded in detail. From one acre of bananas the net result was £368 14s. 0d. from 291 cases. The reduced production was due to the 1954 cyclone which caused severe damage and loss to this section of the Plot.

In association with the Far North Coast Agricultural Region the general field extension programme has been well maintained. Two very well attended field days were conducted in the southern banana districts. For the first time, for the Junior Farmer Clubs on the north coast a special tropical fruit culture field day was held at Dumoon. The response of young and old growers was excellent. A banana plantation project was initiated as an annual competition in the Junior Farmer movement.

A special extension campaign was carried out in the Tweed and Brunswick districts for control of banana rust thrips. Some 26 demonstrations in selected localities were conducted to good effect. This pest is a serious menace to the banana industry. Although increased areas were brought under treatment, considerable rusty fruit will again be marketed.

Press co-operation has been excellent throughout the year.

A special series of film evenings was conducted on the Tweed for branches of the Banana Growers' Federation.

Regulatory Services in the Banana Industry.—Despite staff shortages for much of the year, regulatory work was maintained. Notable success has attended the special effort made to enforce the banana beetle borer regulations. Six prosecutions were successfully conducted for breaches under the Plant Diseases Act. Breaches of the Banana Grading Regula-

tions were considerably reduced, a direct result of heavy penalties inflicted in the previous year. Railhead inspections were periodically made at the principal points, to good effect.

Bunchy Top Control Campaign.—Bunchy Top control has improved since last year. The incidence of the disease this season reflects a return to normal after the drought effects of recent years. Bunchy Top recorded for the past six years is as follows:—

Year.	State Acreage.	Treated.	Bunchy Top per acre.
1949-50	26,198	5,385	0.2
1950-51	24,483	3,831	0.15
1951-52	24,194	3,580	0.14
1952-53	24,448	2,427	0.09
1953-54	28,165	3,104	0.11
1954-55	30,144	2,809	0.09

Closest co-operation in committee and field work continued between the Directors, Banana Diseases Control and Development, and the Department, in operating this highly successful scheme which is costing growers in the vicinity of £32,000 per annum. To overcome serious staff shortages which prevailed for most of the year, officers temporarily accepted additional territory and added responsibilities. This ensured smooth and efficient working of the eradication scheme.

The appointments of an entomologist and a plant pathologist to the Far North Coast Region are expected to bring about important changes in the present pest and disease control programme in terms of efficiency and reduced costs. The two science service officers are stationed in Murwillumbah.

Trends in the Tropical Fruit Industry.—Supplementary irrigation is established as sound practice, but rate of installations has slowed as a result of the heavy rainfall this year. There are now 1,070 acres of bananas under supplementary watering.

Banana growers are taking increased interest in pest and disease control. 3,479 acres brought under treatment this year raise the total area sprayed or dusted to 5,503 acres.

The Banana Growers' Federation has decided to retail bananas in an attempt to create a greater public demand for this fruit and for more equitable returns. Costs of production and marketing are now at such a high level that production of less than 200 cases per acre of good quality fruit will not be profitable.

TROPICAL FRUIT RESEARCH.

Plastic Bunch Covers for Bananas.—The trials were continued but the mild winter was not conducive to results. However, the durability aspect was advanced and detailed temperature recordings were made over a wide range of colours and situations.

Banana Irrigation and Fertiliser Trial.—The trial of "irrigation and no fertiliser" versus "no irrigation plus fertiliser" was continued. An interesting observation was that the time taken by "second bunches" to mature was practically the same, irrespective of the treatment, whereas the "first bunch" from the irrigated treatment matured several weeks earlier than from the non-irrigated. However, production from the irrigated section is still superior.

Banana Planting Distances.—In this trial the section planted 10 ft. x 9 ft. continued to out-produce other sections. The 11 ft. x 11 ft. planting was the lowest producer.

Tropical Fruit Research Station.—Two properties totalling 123 acres have been purchased at Alstonville. A special advisory committee of senior Departmental officers inspected them and has reported recommendations and estimates for initial developmental works.

The Banana Growers' Federation has contributed £5,000 for purchase of research and technical equipment to be used at the Tropical Fruit Research Station.

Trace Elements in Bananas.—Trace elements plots established in the Tweed and Coffs Harbour districts have not yet yielded results. Arrangements are in hand for analyses of leaf samples by the Chemists Branch.

Freezing of Pineapples.—Sugar is commonly added as syrup or as dry sugar to pineapples before freezing. The results of several years' experiments suggest that with pineapples of the correct maturity the addition of sugar is not necessary for the maintenance of quality during storage. However, the overseas market still appears to prefer the sugar-packed fruit.

Passionfruit.

Interest in passionfruit has increased in central coastal districts, and district fruit officers have encouraged an extension of planting in locations where climate and soil give reasonable chances of success.

This fruit has been under-supplied for some years, with high market prices at most periods of the year and processors looking to other countries, notably New Guinea and South Africa, for supplies of pulp.

A very heavy summer crop was produced this year, but the autumn and winter crops were unduly light. Protracted wet weather encouraged vine growth at the expense of winter fruit production.

Diseases were favoured by the wet season. Brown spot and *Sclerotinia* were very troublesome. An outbreak of *Fusarium* wilt was a disturbing development in the Gosford district.

PASSIONFRUIT RESEARCH.

Plants of a *Passiflora edulis* x *P. flavicarpus* hybrid were raised at Gosford Citrus Experiment Station and at Duranbah Experiment Plot for test in the respective district. This cross is expected to produce a large fruit, well filled with pulp. It is reputed to possess some resistance to certain root rots.

The pollination mechanism of passionfruit is being studied, to help clarify the reason for crop failures in some seasons and in certain localities. In particular, the failure of passion vines to fruit satisfactorily in the far western districts of N.S.W. is cited. The vines grow well there and are free from fungous attacks so prevalent in the humid coastal climate, but fruit production is unsatisfactory.

Pome Fruit Industry.

The apple crop of 900,000 bushels was the smallest for many years, and 1,500,000 cases less than the 1953-54 crop. The normal trend to a light crop following a heavy crop was aggravated in the main apple producing districts by severe frosts during blossoming. In contrast, the pear crop was a near record of 500,000 cases of excellent quality fruit, due to good growing conditions and the use of new fungicides.

Trends in the Pome Fruit Industry.—Following the marked expansion of pome fruit areas in the main districts during the past ten years, the rate of plantings declined this year. Most new areas were extensions of existing orchards. The desirable trend confining the bulk of the new plantings to better class districts, and limiting plantings to six or seven most popular varieties, continued.

Owing to economic factors beyond the control of the grower, especially affecting the securing of skilled labour, there is a decided trend towards smaller ("home-unit size") orchards by the subdivision of larger areas. In all districts, however, there are still many orchards which in size, type of plantings, and management needs, are undesirable under existing economic conditions.

The potential for maintenance of apple production is very sound, as indicated by 21 per cent. of young trees in the total plantings. This is ample to make up for normal wastage due to age or other sources of tree loss.

A marked increase in production of early apples is evident, from increased plantings of Gravenstein and McIntosh Reds in the Camden and Kurrajong-Bilpin districts. In the Oakdale district the variety "Early Mac", which was introduced from America by this Division some years ago is fast gaining popularity as a first early variety.

The ratio of one non-bearing acre to ten bearing acres of pears is considered fairly satisfactory to maintain production of this fruit. Pears in this State are normally longer living than apple trees.

Spectacular developments in spraying technique have occurred. The use of both concentrate and dilute air blast machines has at least halved the labour costs for spraying. The general high cost of production and the scarcity of skilled men have encouraged growers to mechanise their orchards with equipment which lowers the cost of production or improves efficiency.

The light brown apple moth has become a major pest trend in most districts. In view of its wide host range it is difficult to control.

Batlow district has developed considerable interest in the Williams Bon Cretien pear for canning.



These Josephine pears at Narara Nursery are only three months grown, on *D.6 Calleryana* pear rootstock.

This rootstock selected by the Department in the 1930's has now been proven the best in Australia for pears.

(Photo from Narara Office).

Willigobung Soldier Settlement.—Field officers continued to supervise the orchards on the Willigobung Soldiers' Settlement at Batlow. Under the conditions which apply to the settlement the settlers have no control of these orchards for a period of some years. In many cases assistance of the settlers is obtained to carry out certain work, but this Department is responsible for determining how and when the work should be effected. The eighteen orchards each of 20 acres comprise probably the largest orchard in Australia under one management.

POME FRUITS RESEARCH.

Rootstock Trials.—At Bathurst Experiment Farm the several apple rootstock trials are concerned mainly with testing the performance of the common stock, Northern Spy, against other stocks including seedlings of the main commercial varieties, *Pyrus malus baccata*, East Malling clones, and varieties on their own roots. Variations in propagation practice such as high and low budding, use of an intermediate stem piece, and deep and shallow planting, are also under test with the stocks. It is not possible to generalise the results since they vary with the scion variety, but one feature is the good performance of Northern Spy and another feature is the good performance of trees on their own roots.

In the pear rootstock experiments the outstanding performance is that of D6 stock, a selection of *Pyrus calleryana* made by the Division several years ago.

Crop and growth records of the apple and pear rootstock trials have been maintained for many years and a review of this work will be published in the near future.

Hormone and Foliar Sprays.—Considerable interest has been shown in thinning sprays, as a means of levelling production from year to year and of improving the size, colour and quality of fruit in the heavy year. Experiments have shown that naphthalene acetic acid is the most satisfactory commercial material available. It may be used on most commercial varieties of apples at 10 parts per 1,000,000. Trials with naphthalene acetamide, which has been reported to be superior to naphthalene acetic acid, were inconclusive this year at Bathurst Experiment Farm, due to frost damage.

Various preharvest drop sprays are available. Most interest is in 2,4,5-TP. It has proved effective. On Gravenstein and McIntosh apples it has advanced maturity by a week. The results of this work will be used extensively by growers next season.

Urea Foliar Sprays.—Continued experiments show that response to urea spray occurs in some circumstances. Good results were obtained with pears at Batlow this year, but apples in several districts showed only an indifferent response.

Apple and Pear Breeding.—The topworked selections are coming into heavier fruiting under orchard conditions and it is obvious that several will be worthy of naming and release. On the other hand, the conditions have enabled several to be discarded. Only the slightest susceptibility to powdery mildew and black spot is tolerated at this stage of trial of the selections.

Further new selections have been made in the seedling blocks for top-working and trial under orchard conditions.

Fruiting of Pear Stock D6.—Preliminary investigations at Narara into the fruit setting of the pear stock D6 suggested that it is to some extent self-sterile. Further study of this problem is projected.

Apple Storage.—Preliminary results of studies on the storage behaviour of apples from different rootstocks indicate that the influence of the respective stock varies with the scion.

Data from two years' work indicate that for Granny Smith apples a storage temperature of 30°F. yields better retention of firmness than does 32°F., and does not increase liability to scald. For Delicious apples, 32°F. was better than 34°F. and if the fruit was of a type not susceptible to low temperature breakdown, 30°F. gave better results than 32°F.

A study of the affects of carbon dioxide and oxygen, respectively, on the behaviour of Granny Smith apples was undertaken this year. Results have provided further information on the affects of different levels of carbon dioxide and oxygen on storage disorders, rots, softening, and palatability.

"Twist" of Gravenstein Apple.—The several years' investigation of this destructive condition of Gravenstein apple has been finalised. The results will be published shortly. It has been shown that the abnormality may be controlled by certain nursery and cultural techniques.

Stone, Dried, Berry and Miscellaneous Fruits and Nuts.

Extension Work in Stone Fruits, etc.—District fruit officers were consistently sought by stone fruit growers, and particularly in relation to contour design and lay-out of plantings, drainage and supplementary irrigation. It was necessary to make still greater use of broadcasting and the press, organised group meetings, and field days, to meet the increasing demands of fruitgrowers for information and guidance.

Special extension campaigns have been conducted in a number of districts to cover particular phases of the stone fruits and dried vine fruits industries.

In respect of dried vine fruits, campaigns were conducted for black spot and downy mildew control, especially in Murray areas. Special attention was given to the large group of new settlers at Coomealla and Ellerslie. A series of field days was held to demonstrate routine cultural practices, pruning and care of young vines, and to guide the establishment and development of the vineyards.

In the M.I.A., warnings by horticultural officers concerning likely losses from Oriental peach moth and brown rot aroused the growers' interest. Special meetings were arranged with grower organisations in order to minimise the effects of these troubles on the canning peach crop.

The fertiliser programme for all fruits in the M.I.A. was revised, and a new fertiliser calendar has been issued to all fruitgrowers.

Factors influencing prune size and quality in the Young district received priority in extension work. Improved soil management, systematic pruning, and better control of pests and diseases were stressed.

Growers at Batlow have been induced to plant Elberta peach trees, to supply the local cannery. Divisional officers have underlined the likely difficulties in peach growing in this part of the State. At the request of local organisations, full instruction concerning cultural practice has been given to the growers as individuals and groups.

In parts of County Cumberland the subdivision of orchards into smaller units is continuing. This has greatly increased the number of growers requiring instruction.

Very few new areas without at least a contour survey for drainage before planting were planted in coastal districts.

In the Gosford district certain areas where citrus is declining were surveyed to determine the possibilities of reconstruction by planting pome or stone fruits. A considerable area is involved. The matter is receiving careful attention by specialist and district fruit officers.

Improved orchard soil management practices received considerable attention in various districts, and especially the effect of subterranean clover on soil fertility and erosion control. Increasing numbers are adopting the practice with good results.

Concentrate spraying equipment is now established in a number of districts. Growers' interest in these and other high pressure spray outfits has been stimulated by the need to reduce orcharding costs. Demonstrations by horticultural officers have fostered this interest.

Trends in Stone Fruits and Dried Fruits Industries.—Interest in planting of canning peaches has revived in the M.I.A. The demand for trees exceeded supply in the 1954 winter. However, a fairly heavy mortality of trees in some sections, due to heavy rains in February, 1955 offset the increased planting. Accordingly the downward trend in M.I.A. peach acreages is still apparent.

Canning peach yields in the M.I.A. have progressively increased from an average of 3.05 tons per acre in 1942/43 to approximately 6 tons per acre in 1954/55. Much of this increase is due to this Department's investigational and extension work.

Small sized prunes, difficult to dispose of in export and domestic markets, are a problem in that industry. Improved cultural methods are being pressed by the extension service.

The subdivision of orchards into uneconomic units continued in near-Sydney areas. Poor management by inexperienced, often "week-end", orchardists has occasioned a fairly rapid decline in tree health and production.

Development of supplementary irrigation to increase production and improve quality continued. Many orchardists now have water storage dams and permanent spray line irrigation.

In coastal districts the definite tendency is to limit the peach season to varieties ripening up to and including Blackburn.

Growers in the Orange district have continued to reduce areas of plum trees.

Difficulties in the dried vine fruits industry, and wine trade, will slow down such Murray River district plantings. In mid-Murray areas, however, the tendency is to plant limited numbers of early apricots and plums, where soil and conditions are suitable.

STONE FRUIT RESEARCH.

Cherry Breeding.—The first cherries from Departmental breeding have been named for release. They are Rival and Regina, two early varieties of good commercial qualities with marked resistance to splitting, and Ransom, a good variety which ripens shortly before St. Margaret. These varieties fill gaps in the market succession of varieties.

Stone Fruit Thinning.—A suitable chemical method of thinning stone fruits is needed. They require more thinning action than any other class of fruit. Experiments are proceeding at Experiment Farms and in private orchards. It has been shown that the material and strength to apply depend on variety reaction. Dinitro-ortho-cresol at no more than 0.05 per cent. appears to be the most promising in general, but 3-chloro-isopropyl-phenyl-carbamate and maleic hydrazide, used at much lower concentrations, are effective in certain circumstances.

Freezing of Stone Fruits and Berries.—Experiments on free-stone peaches have indicated that an ascorbic acid level of 150 mg. per 1 pound pack prevents serious browning. The indications have been derived from three peach varieties in only one season, and are therefore only a tentative result.

For apricots, further information has been obtained on the amount of sulphur dioxide necessary for a satisfactory product. Initial concentrations of 70-100 parts per million for syrup-type packs and 25-30 p.p.m. for dry sugar-type packs are suggested. Dipping procedures to give various levels of sulphur dioxide during freezing, storage, and thawing are being studied.

Tests of berry fruit varieties, and methods of packing, for freezing, have continued. The Tasmanian Department of Agriculture and the C.S.I.R.O., Hobart, have supplied the fruits.

Peach Pruning Trial.—The importance of heavy or light pruning, as the case may be, in the formative years, has been shown by peach yields in the M.I.A. The heavily pruned trees bore their first good crop this year at nine years of age. Respective yields of the lightly pruned and heavily pruned trees in the past four years have been 2, 6, 11, and 15 tons, and nil, 0.5 3, and 12 tons. The trunk girths are about equal, indicating that light pruning has produced comparable trunk growth as well as the strikingly superior yields.

Peach Breeding and Selection.—At Yanco Experiment Farm, crosses have been made using Wight and Young's Oling as the female parents with Golden Queen, Young and Wight pollen. Seeds obtained have been stratified for raising next spring.

Peach seedlings of J. H. Hale are being raised at Bathurst Experiment Farm for selection purposes. The aim is a variety similar in most characteristics to J. H. Hale but maturing slightly later. The first batch of seedlings, planted in 1953, are expected to produce next year a quantity of fruit for assessment.

Apricot Breeding.—Some varieties have been planted out in the arboretum at Yanco Experiment Farm; and seedlings of Shipley, Blenheim and Hennig's Late have been raised for planting out and observation, in an effort to obtain a late variety.

Internal Breakdown of Apricots.—Research has yielded further leads. Internal breakdown is consistently less where trees have been superphosphated. Records were obtained of the effect of high temperature on internal breakdown incidence.

Apricot Pruning.—At Yanco Experiment Farm, trials are under way to resolve the problem of eliminating the strong water-shoots typical of apricots. The retention of some well placed strong water-shoots left untipped has resulted in less water-shoot development and a prolific production of spurs along the water-shoots retained. Stubbing of water-shoots to one foot in length has perpetuated water-shoot development and depressed spur formation. Complete removal of the water-shoots gives a similar result.

Preharvest Drop of Prunes.—Irrigation had a notable effect on the problem this year. Early wilted trees gave 114 lb., late wilted trees gave 184 lb., and well irrigated, non-wilted trees gave 203 lb. fruit per tree. Wilting early in the season increased fruit drop at the pit-hardening stage and reduced the final yield.

Prune Fertiliser Trials.—Fertiliser trials in prunes laid down at Young in 1953 have indicated that applications of nitrogen will increase yields of fresh fruit. However, the trials need to be continued before an assessment of the effects of various fertilisers on fruit quality can be made.

Prune Stock Trials.—Plots of d'Agen prune trees on various stocks, in various prune-growing districts, are now bearing. Outstanding differences have not yet been observed, except that tree growth is consistently more vigorous on Buck plum stock.

Strawberry Investigations.—Strawberry improvement work is centred at Narara. The aim is virus-free new strawberry varieties of high commercial quality. A bed of 360 strawberry seedlings has been planted for selection. Nine new selections were made in 1954 and, with three 1953 selections, are being further tested for yield, quality and general field performance. Unfortunately, the most promising selection of last year proved susceptible to mildew (*Sphaerotheca humuli*) and had to be discarded.

Hormone weedicide experiments for control of weeds in strawberries are now in the third year and yielding useful data.

Systemic insecticide sprays to control insect vectors of virus diseases have been under trial during the past two seasons. Results are not apparent, because of small insect populations.

Variety Trials.—Locally raised and introduced stone fruit varieties are continuously under trial in private orchards, and at Experiment Stations, in all main fruitgrowing districts. In addition to several local seedling peaches, the recently imported varieties Redhaven, Earlyvee and Somervee were planted out for field testing. Several of the newer peaches under test were very promising last year. At least two of them may become commercially useful.

Pecan Nuts.—Factors affecting yields of pecan nut trees have been investigated at the Gosford Citrus Experiment Station where a large collection of pecan nut varieties is grown. The period of pollen ripening in relation to stigma receptivity has been studied. This factor has an important bearing on cropping potential. Data on varietal characteristics, yield, and percentage kernel, are also being collected.

Almonds.—Almond variety plots were planted on a number of properties in the Young district in 1941-42 and 1947. Results indicate clearly that almonds are less profitable than other stone fruits in the district. Most of the trees are now being top-worked to other kinds of fruit, and the suitability of almond trees for this purpose is being studied.

Hazel Nuts.—Trees in a trial at New England Experiment Farm are now 18 years old, and the 30 varieties show wide variance in tree growth, vigour and yields. The varieties which have cropped most consistently are Hemples, Tonollo, Imperial de Trebizonde and Atlas.

Macadamia Nuts.—Many samples of Macadamia nuts from selected trees were collected and forwarded to the Queensland Department of Agriculture and Stock for processing to a plan. These samples in general were fairly promising. Some were outstanding. Processing investigations are now proceeding. The outcome of these trials may determine whether the available local seedling crops are a potential, payable proposition to the grower.

New grafting methods under development at Duranbah Experiment Plot are promising. An imported strain from Hawaii has now been established as topwork. Reciprocal exchanges of material have been arranged with Hawaii and, if propagation investigations are successful, better strains will be quickly reproduced.

Fruit Tree Propagation.—Raffia, the standard material, is being compared to two types of plastic strip for tying buds and grafts. Peach, apricot and cherry stocks are being used to test the efficiency of P.V.C. plastic film (vynex vinyl) and alkathene film in strips of appropriate width. A small previous test at Bathurst indicated that plastic tying material may be much superior to raffia in budding and grafting certain kinds of fruit trees.

Wine and Table Grapes.

The year's wine crop is estimated at 1,800,000 gallons, compared to the record 5,070,000 gallons, including distillation material, in 1954. Early in the season the estimate was 3,600,000 gallons potential, but climatic conditions reduced the crop by half. Rain and humidity in December, 1954 and subsequently, favoured fungous diseases. Downy mildew was very active in the Hunter River district, seriously damaging the foliage and fruit. Other districts suffered similarly. Apart from diseases, rain during the ripening and vintage period

caused breakdown in the berries and reduced the sugar content. The quality of the wine was affected. Some wines are satisfactory but much of the vintage is inferior. A considerable gallage in the M.I.A. could only be classified as distillation material.

Table grapes in the M.I.A. incurred heavy losses due to unfavourable weather in February and March. Downy mildew was severe following these rains and heavy defoliation occurred prematurely.

Horticultural officers advised wine and table grape growers and wine makers by personal visits, press articles and broadcasts.

Vine Spacing Trials.—Heavy, continuous rains prevented the weighing of the grapes from this trial. The fruit that could be picked was sent to the winery.

O'hanez Trial.—This plot on high trellis set a satisfactory crop, but the crop was spoiled by the rain. The fruit worth picking was sent to the winery.

Phylloxera-resistant Stock Trial.—Comparative tonnage figures were not recorded, because of the wet weather. In all, 14 tons of grapes were sent to the winery. Baume readings were exceptionally low.

Griffith Viticultural Nursery.—120,000 cuttings of Phylloxera-resistant stock wood were made and planted in the Nursery. Some 40,000 vine rootlings are expected for distribution. The demand for Phylloxera-resistant rooted vines is similar to last year's.

Narara Sub-Station.—The propagation of Phylloxera-resistant vine stocks was continued at Narara Sub-station. About 2 acres of "mother" vines were maintained and yielded 46,000 vine cuttings. Black spot infection was severe on susceptible varieties. Some 2,200 rootlings were lifted and were available for disposal at 30th June, 1955.

Wine Grape Trial at Molong.—The vines are progressing satisfactorily.

Oenology Training.—An officer of this Division commenced the Oenology course at Roseworthy Agricultural College, South Australia, in February, 1955.

Fruit Packing—Extension Service.

A fruit packing instructor was appointed this year, with salary from the Commonwealth Agricultural Extension Grant. Practical demonstrations and advice on picking, grading and packing of fruits have been given, in consequence, in each of the main fruitgrowing districts. The appointment for this work is proving most valuable. This will be reflected by improved packing standards for local, interstate, and export marketing.

Fruit Preserving—Extension Service.

The fruit preserving instructor resigned this year. The officer lectured and demonstrated at field days and meetings of Agricultural Bureau branches and women's organisations. Numerous inquiries relating to fruit and vegetable preservation were dealt with by correspondence.

DIVISION OF ANIMAL INDUSTRY.

The staff position again deteriorated. Four trainees, and a special veterinary research officer of considerable qualifications and experience resigned. A new position was created, removing the Chief of the Division from the effective strength to the position of *Emergency Chief*. The loss of the two experienced officers is severe. There were five appointments, but all are junior veterinary officers.

The position in respect of inspectors of stock improved slightly but, of the 59 districts three first class and all 17 second class districts are vacant. Seven inspectors have been re-employed after retirement, to help ease the situation.

Conference on Foot and Mouth Disease.

A conference of senior officers including district veterinary officers discussed the action which would be taken by the Division in the event of an outbreak of foot and mouth disease. To increase the value of the discussion the district veterinary officers were set a problem, by furnishing them with basic data relating to a supposed outbreak in the metropolitan area. Each was required to submit a report on the action he would take if he was the district veterinary officer for the Cumberland district. A solution was also prepared by the principal and assistant principal veterinary officer at head office. The head office solution formed a basis of the conference discussion. Points which needed emphasis and further discussion as evidenced by omissions in the several reports were fully ventilated.

Representatives from the New South Wales Treasury, Government Stores Department, and Police Department, and also the Director, Division of Animal Industry, Queensland Department of Agriculture and Stock, and the Assistant Director of Veterinary Hygiene, Department of Health, Canberra, attended.

Follow-up actions which emerged from the conference are being taken.

Disease Incidence.

The unusual seasonal conditions had a profound effect on the incidence of certain diseases. Following the floods blow flies became extremely active and there were excessive outbreaks of worm infestation, with *Haemonchus* most prominent, and of footrot and foot abscess in sheep. In the coastal areas there were sickness and mortality in cattle depasturing on flood-damaged pastures. The cause was not apparent. There were outbreaks of neo-natal mortalities in lambs and, towards the end of the 12 months, widespread occurrence of urinary calculi in wethers.

Anthrax.—It was a bad year for anthrax, 26 outbreaks having been recorded. The fall of grass seed was very late, and the prolific seeding and heavy rainfall apparently turned up more infective material than for many years past. Outbreaks were recorded in cattle, sheep, pigs, dogs, and seven humans were also infected. A total of 4,138 head was placed under quarantine restrictions. Deaths totalled 33 cattle, 4 pigs, 354 sheep and a few dogs.

It was interesting to note that in pigs and dogs the injection of an adequate dosage of penicillin will frequently assist recovery. This is in line with the latest treatments adopted by the medical profession for anthrax in humans.

Bovine Pleuropneumonia.—Only one outbreak was recorded. This was in the Bourke district in May. There were 177 head of cattle involved on the outbreak property, and 4,221 contact cattle. Only one extension occurred, to an adjoining property. Control is still being exercised over this outbreak at the 30th June, 1955.

There was no further extension of the outbreaks reported for 1953/54, and all properties involved have been released from quarantine.

The Kiama-Cooma protected area was extended to include the Gundagai Pastures Protection District and was renamed The South Eastern Protected Area.

Brucellosis (Cattle).—Under the Departmental Brucellosis-free Herd Scheme, 15 registered studs and seven herds other than studs were tested, involving 1,898 cattle. The number participating in this scheme was reduced again for the reasons outlined in the 1953/54 report.

Tuberculosis (Cattle).—(a) Testing of cattle under the *Milk Board Scheme* is summarised in the following table:—

Area.	Number Tested.	Number Reactors.	Percentage Infected.
			per cent.
Metropolitan	13,119	151	1.15
Blue Mountains	180	1	.50
Wollongong	733	3	.31
Hunter District	1,725	...	...
Erina District	604	...	...
Newcastle District	880	3	.34
Upper Hunter District	40	...	...
Totals	17,281	158	0.91

In the previous year 25,080 cattle were tested and 1.02 per cent. were found to be infected.

(b) *T.B.-Free Herd Scheme.*—Fifty-two stud herds and 105 herds other than studs, involving 11,780 head of cattle, were tested under this scheme, an increase over the previous year's figures.

(c) *T.B.-Protected Areas.*—The annual test of cattle in 21 Protected Areas was carried out, and incidence remained at a very low figure. In the 3,768 head of cattle tested only two reactors were detected. The Broken Hill Protected Area again remained free from tuberculosis. The single reactor detected revealed no lesions on post-mortem examination.

(d) *Local Government Scheme.*—Testing was undertaken in seven areas in the Local Government Scheme as distinct from testing in Protected Areas. In 6,508 cattle tested 61 reactors were detected.

(e) *Miscellaneous Testing.*—Approximately 63,000 cattle were tested as compared to 113,000 in 1953/54, and the incidence of reactors was 6.51 per cent. as compared to 4.56 per cent.

Tuberculosis in Pigs.—The total of pigs submitted to test was 2,285, with 1.44 per cent. incidence of reactors.

The 1953/54 experience, when a number of pigs giving positive reactions failed to show lesions on post-mortem examination, was repeated. Consequently, the slaughter of reactors to the tuberculin test in pigs, particularly where there is a history of relative freedom of the herd from this disease, should be approached cautiously. It has not been possible to identify the cause of the non-specific reactions.

John's Disease.—No outbreaks were recorded.

Trichomoniasis.—Six outbreaks were recorded, all in the Moss Vale Pastures Protection District. The policy of slaughtering infected bulls, frequent examination of the cattle for pregnancy, and the insistence on sexual rest of females exposed to the disease for a period of three months, while exhibiting regular heats, has achieved control of the disease on known infected properties. There is no doubt however that this disease is more widespread than the known infected properties.

Sterility in Dairy Cattle.—This remains one of the most serious problems of the dairy industry and there is more need than ever for field investigations. The causes of infertility in dairy cattle are numerous, but reports indicate that a purulent condition of the uterus or vagina, occurring within one or two days of service, has assumed rather serious proportions in certain coastal areas. The cause has not been determined.

Brucellosis-free Herd Scheme (Swine).—Twenty-two registered stud herds and 16 non-stud herds involving 910 pigs were tested.

Avian Tuberculosis.—Since 1945 increasing properties in the Riverina have been found to be infected with avian tuberculosis. In the interim 59 properties have been brought under control. Prior to and for a few years after 1945 the policy was to use the tuberculin test as a method of control, by

frequent testing and elimination of the reactors. It became evident, however, that this was merely perpetuating the disease.

In 1949 the disease was detected in the Wagga Agricultural College flock. It was decided to eradicate the disease, if possible, by spelling the ground on which the infected poultry had run. This was possible either by removing all poultry from the property for two years or by running poultry in intensive houses with concrete floors or as a separate unit on clean ground. Now 59 properties have been or are in the process of being dealt with by the method. In 26 cases the disease is considered to have been eradicated, in 7 the position is doubtful and in the remaining 26 cases the properties are still under control.

The results on many properties for which eradication is claimed have been checked by means of flock tests of birds raised on previously infected ground. The flock tests were conducted at intervals of 12 to 18 months after restocking so that the disease has had ample time to reappear if present.

Blow Flies.—Blow fly strike in sheep was extremely troublesome owing to the seasonal conditions. Some losses were in sheep which, because of the floods, could not be protected against strike. However, many owners packed spraying material and equipment by horse to marooned sheep and were able to reduce the losses.

There has been a tremendous increase in the use of the latest insecticides, Aldrin and Dieldrin, in the prevention of blow fly strike. Reports from the field indicate that these substances gave very satisfactory control for long periods. They were applied by dipping, by tip spray and by jet.

Internal Parasites.—The wet and the warm weather resulted in a very extensive build-up of *Haemonchus* Spp. in sheep and cattle. Despite phenothiazine and other appropriate measures such as spelling of paddocks, losses were serious. At the close of the year losses were still being experienced from chronic haemonchosis. Under normal conditions that would not be so.

In recent months there has been a build-up of small intestinal worms, but fortunately they take longer than *Haemonchus* to reach epidemic proportions. Phenothiazine of small particle size is the drench most commonly used to combat these infestations.

Fluke Infestation in Cattle.—In some coastal areas immature stomach flukes (*Paramphistomes*) and liver flukes were troublesome. Hexachlorethane gave some relief. Little was done to reduce the pick-up of infective material from pastures.



Internal Parasites.

Post-mortems for a closer study of internal parasites have been frequent at field days in view of the favourable seasons for this type of pest.

(Photo from Orange Office.)

Footrot of Sheep.—This was again prevalent. Conditions were ideal for it to develop and spread over wide areas. Departmental recommendations of formalin and bluestone are being supplemented by chloromycetin in methylated spirits but good control can be achieved by using the former two materials.

Pregnancy Toxaemia.—This was widespread, particularly just prior to the autumn lambing, but losses were not serious. The wet autumn, worm infestation, and footrot contributed to a reduction in food intake which initiated outbreaks. Treatment with glycerine as recommended by the Department gave satisfactory results, particularly where it was applied early in the disease.

Malignant Catarrhal Fever.—It has not been possible to confirm that this disease is present in New South Wales. Laboratory examination of specimens suggests that it is a strong possibility but transmission to susceptible animals has not been effected yet. Two properties in the Wagga and one in the Bathurst district have almost certainly been affected and there have been also five probable and at least eight possible cases, mostly the Riverina.

These cases are not related to each other nor to any consistent factor such as contact with imported stock or overseas visitors. Only single cases were seen in each herd.

Photosensitisation.—This was widespread during the summer. Some reports were received from as far west as Broken Hill, of sheep apparently affected with photosensitisation. The main incidence was from mid- to late-summer. It followed the ingestion of toxic plant material which grew rapidly after the breaking of the dry spell. Several plants were incriminated. The main offender seemed to be a panic grass.

Urinary Calculi in Wethers.—In April and May, western and southern districts reported this condition to be prevalent. Losses occurred in sheep on good feed. The calculi were present either at the flexures or at the commencement of the urethral process. The calculi did not appear to be of mineral origin.

Leptospirosis.—Most parts of the State excepting the Western Division reported outbreaks of leptospirosis in calves or pigs. Adult cattle blood samples from various properties indicated that the cattle had been exposed, particularly *L. pomona*. Attempts to isolate the casual organism by injecting urine from the reacting cattle into guinea pigs, which are susceptible to infection, were unsuccessful.

A number of calf mortalities due to leptospirosis occurred.

In pigs the disease caused abortions, and neo-natal piglet mortalities. After the initial outbreak there was usually very little trouble. *L. somona* was a main offender, but there was some evidence also to incriminate *L. hyos (mitis)*.

Hypocuprosis.—Some areas in the Casino district have been newly found to be copper deficient. Specimens of blood and liver have indicated substantial deficiencies in copper, sufficient to interfere with growth and production. Marginal deficiencies have occurred in the Port Macquarie district. Other coastal areas may be deficient in this element. On the south coast a small area near Bega, on field evidence, is marginally deficient. The deficient areas are being pinpointed with a view to advising owners on methods of overcoming the problem.

Ornithosis.—An outbreak was suspected at Auburn. Eight parrots had been purchased by the owner from an aviary at Northmead. They were of a consignment from Adelaide which previously caused an outbreak at Cootamundra. All the birds introduced had died when, later in the year, a member of the family contracted the disease. Inspection of the aviary failed to reveal evidence.

Another outbreak occurred at Canberra in birds purchased from an aviary at Hurstville. Inspection of the aviary again failed.

Neo-natal Lamb Mortalities.—The Cootamundra district veterinary officer reported fairly widespread neo-natal mortalities in lambs in April and May. There were also reports of this condition from the Orange district veterinary officer. In the main the condition does not appear to be infectious and only a small proportion appeared to be due to continuous grazing on subterranean clover pastures.

Infectious Laryngo-tracheitis.—An outbreak of fairly mild pathogenicity occurred at Hawkesbury Agricultural College. This necessitated vaccination of the College flock. Annual vaccinations will be necessary henceforth.

Ovine Brucellosis.—The overall experience of district veterinary officers, inspectors of stock and livestock officers (sheep and wool) is that ovine brucellosis is not of high incidence in

New South Wales. Staff shortage has prevented a systematic survey but officers have the opportunity to examine rams on properties and at sales. Cases encountered are in the older type of ram which has been used over several seasons' mating.

In a Dorset Horn stud in the central tablelands, observations have been made on the sires, used in last season's mating, which developed epididymitis during the hand service season and are now showing a positive reaction to the complement fixation test. The ewes will be examined to detect by the complement fixation test the incidence of infection. The conception rates obtained from the positive reaction rams were very low.

External Parasites of Sheep.—A change in policy was adopted at Flemington Saleyards to inspect sheep offered for sale, to require withdrawal of infested sheep and immediate appropriate action—either disposal for immediate slaughter or shearing and dipping. In consequence, the position at Flemington has greatly improved, and must be reflected throughout the State. When the policy was introduced the infested pens were numerous and some were heavily infested.

Since September, 1954, when inspections were initiated by three saleyard inspectors, 2,090,502 sheep have been examined in 11,635 pens; only 98 pens held infested sheep, involving 16,014 sheep.

Animal Quarantine Service.

Sydney waterfront and airport arrivals kept the Animal Quarantine Service alerted.

Migrant Baggage.—The increase in European migrants was an important factor in livestock disease anxieties. Many migrants attempted to conceal and smuggle home-made cheese and salami in their baggage.

Animal Products.—Early in the year, Customs issued an import licence for salami which, on arrival, was refused entry by the Animal Quarantine Service. This led to a tightening of liaison between the two Departments. All applications for import licences for animals and animal products are now referred by Customs to the Animal Industry Division of the Department of Agriculture.

Importation of manufactured cheese was supervised by the Commonwealth Department of Commerce and Agriculture last year but now this Division supervises the importation. Unpasteurised cheese could contain the virus of foot and mouth and other diseases. Tinned meats which are not thoroughly cooked present a similar risk. Towards the close of the year recommendations for tighter restrictions of entry of these products were being formulated.

Small Animals.—Continuous efforts were made to effect control over ships' pets. Several ships' pets, where restraint was not guaranteed, were destroyed. A traveller from Hong Kong attempted to smuggle a dog at Sydney; the attempt was detected and the dog destroyed.

Cattle.—The heifer imported from England last year, found on arrival to be affected with Actinomyces, was released under perpetual surveillance. The abnormality had remained dormant.

Three head of cattle died while at the Quarantine Station, due to toxic condition characterised by haemorrhagic gastroenteritis. Despite extensive investigations the exact cause was not determined. Cattle imported from the United States of America were tested for Bluetongue. No positive reaction was detected. They included a further consignment of Santa Gertrudis cattle. Very heavy infestations of warble fly larvae in some cattle in one shipment received particular attention.

Monkeys for Salk Vaccine.—Consignments of monkeys from India and Malaya arrived by air by special permission. These went to Commonwealth Serum Laboratories in Melbourne for use in the manufacture of the Salk Poliomyelitis vaccine.

Bovine Semen.—The ban placed on the importation of semen early in the year was lifted and one consignment entered. Very few pregnancies were obtained with it.

Caged Birds.—It was found that cage birds might be imported from England via New Zealand. Their importation from England is prohibited. Steps were taken to ensure that only New Zealand bred birds came from New Zealand.

Distemper Vaccine.—Approval was given for egg-adapted distemper vaccine to be imported from New Zealand. Applications to import it from South Africa and the United Kingdom were refused because of Newcastle Disease in poultry in those countries.

Quarantine Station.—Work commenced at the Quarantine Station at Abbotsford to extend and renovate the accommodation for cattle, the feed storage shed and the small animal kitchen.

The following is a comparative summary of the quarantine activities for 1953/54 and 1954/55:—

	1953/54.	1954/55.
Permits to land animal product (overseas)	1,829	2,231
Permits to land livestock (overseas)	450	456
Permits to land animal produce (interstate)	1,186	782
Permits to land livestock (interstate)	12	13
Animals put into quarantine	179	194
Animals died in quarantine	—	3
Animals exported overseas (excluding poultry)	11,353	2,340
Animals exported by sea (interstate)	337	343
Poultry exported overseas, including day-old chickens	55,386	53,927
Number of tanneries registered	30	29
Number of feather mills registered ..	3	3
Number of A Class zoological gardens licensed	1	1
Number of B Class zoological gardens licensed	6	6
Number of B Class circuses licensed .	15	15
Number of A Class theatres licensed ..	—	1
Number of B Class theatres licensed .	2	1
Approved place for treatment of pig hair	—	1

Cattle Compensation Act.

A further disease, *Vibriosis*, was proclaimed as a disease to which the provisions of the Act apply.

Particulars of the claims dealt with are:

Disease.	Claims.		Cattle.		Net Compensation.	
	No.	Per cent.	No.	Per cent.	Total to Nearest £.	£ per Head.
Tuberculosis	4,442	73.9	9,467	82.3	154,861	16.3
Cancer	631	10.5	893	7.6	11,362	14.0
P.P.C.	10	0.16	27	0.2	470	17.4
Actinomycosis	920	15.4	1,148	9.9	13,093	11.3
Johnes Disease	...	...	...	...	...	...
Tick Fever	4	0.07	4	0.03	101	25.0
Trichomoniasis	5	0.08	6	0.05	63	10.5
	6,012	...	11,535	...	179,955	15.5 (average).

About thirty claims were refused because the disease was advanced when its presence was notified by the owner. Some late claims also were refused.

Field officers have been instructed to provide more complete information, to facilitate quicker handling of contentious claims. The information will enable a review of the period adopted as reasonable for elapse between commencement of the disease and the owner's recognition of it. A difficulty is the delay occurring between notification and inspection, in districts where there is no stock inspector, and on inaccessible properties.

Stock Foods and Medicines Act, 1940.

There were 800 stock foods registered during the year. Sampling and analysis were conducted to check on the quality of the foods. Several firms were warned for minor deficiencies. In four cases, serious deficiencies in protein content were detected and prosecutions were recommended. Two cases have been heard; fines amounted to £9. A prosecution for selling an unregistered stock medicine resulted in a fine of £5.

The Board received 1,336 applications for the registration of Stock Medicine. These were scrutinised by the Division of Animal Industry.

Meat Inspection Service.

Staff.—At 30th June, 1955, the staff comprised the principal veterinary officer, assistant principal veterinary officer, two veterinary officers, two clerical assistants, 107 meat inspectors and 13 brand boys. Seven meat inspectors resigned and 12 were appointed. They are still 12 below strength and not sufficient to man all stations fully.

Essential inspection was maintained at other stations by depleting the strength at Homebush. Prior to the commencement of the Commonwealth-State co-operation scheme the only occasions on which all inspection positions were fully manned were when slaughtering decreased as a result of industrial disputes. The average daily deficiency of inspectors at Homebush was almost 10; 20 per cent. less than required for full inspection.

State Abattoir, Homebush Bay.—Veterinary officers maintained the usual supervision over routine meat inspection and ante mortem inspection. Special attention was given to hygiene on the killing floors, and in the boning units and meat market. Close liaison with officers of the Metropolitan Meat Industry Board on matters of hygiene and inspection facilities resulted in a general improvement, but there are still some unsatisfactory features.

Commonwealth-State Co-operation Scheme.—A system of exchange of meat inspectors between the Commonwealth and State Services was commenced on 21st February, 1955, for a trial period of three months. The trial period was later extended to 31st December, 1955. This scheme provides for the progressive reduction of each staff by ten inspectors and reciprocal borrowing to enable both export and trade meat to be inspected with the depleted staff. No reduction has been made in the strength of the State inspection staff since it was already ten below requirements. On only twenty-one days was the required number of inspectors supplied by the Commonwealth, and on some of these days full requirements were not met for the whole day. The daily deficiency from 21st February to 30th June, 1955, despite Commonwealth assistance, ranged from one to twelve inspectors, with an average deficiency of four.

Meat Market.—All meat entering the meat market at Homebush Bay from country and inter-State abattoirs, day or night, was inspected and recorded on arrival. Special attention was paid to hygiene of meat handling within the market, and of vehicles used to and from the market. The carriage of meat from the meat market in unclean and unsuitable vehicles led to the prosecution and conviction of three butchers. One prosecution was undertaken by the Department, and the other two by the Department of Public Health on evidence supplied by a market inspector.

Stock Inspected.—The number of all stock inspected, except sheep, shows an increase on the previous year. The greatest increase was in the pig kill, approximately 39 per cent. over the previous year. Details of the number of stock inspected for the years 1953-54 and 1954-55 are:—

Year.	Cattle.	Calves.	Pigs.	Sheep.
1953-54	191,590	107,169	112,863	2,687,152
1954-55	200,176	121,021	157,259	2,460,490

Private Abattoirs in the Metropolitan Area.—It was again impossible to maintain complete veterinary supervision over the two abattoirs and several small slaughterhouses within the County of Cumberland. However, they were visited by veterinary officers as often as possible.

The rebuilding of licensed slaughtering premises in the outer metropolitan area proceeded slowly. Time was devoted to advising owners regarding suitable construction but no new premises were completed by 30th June, 1955. Three premises were in course of erection. One had been completely remodelled and another was re-modelled but required further work to reach the necessary standard. One licence was cancelled and three were suspended pending the completion of new premises.

The number of cattle and calves killed at private abattoirs in the metropolitan area decreased, but the sheep kill increased slightly and a substantial increase, almost 300 per cent. occurred in the pig kill. Details of stock inspected, compared to 1953-54 are:—

Year.	Cattle.	Calves.	Pigs.	Sheep.
1953-54	91,269	9,642	6,543	942,004
1954-55	72,977	6,558	25,085	1,003,638

Knackery Inspection.—All horses slaughtered for animal consumption were inspected at slaughter and the methylene violet spraying of carcasses and meat was supervised for the Department of Public Health. In the four knackeries a total of 7,780 horses was killed.

Saleyards Inspections.—All cattle passing through Flemington saleyards were inspected by a senior inspector, and cattle and pigs sold at private saleyards and clearance sales within the Metropolitan Abattoir Area were inspected. At Flemington, cattle consigned as suspects were recorded and identified and all diseased cattle found on inspection were marked as suspects.

Of the 235,433 cattle inspected at Flemington, 2,808 were recorded as suspects, and of the 3,506 inspected at private saleyards the suspect score was nil.

City Office, Meat Re-Inspections.—Eight inspectors, including a senior, worked from the city office to re-inspect meat introduced into the Metropolitan Abattoir Area. They also inspected meat supplied under contract to Government Institutions, watched for illegal introduction of meat, inspected butchers' shops and also stock at some clearance sales.

Lamb Branding.—State meat inspectors at five abattoirs selected lamb for sale within the Metropolitan Abattoir Area and proclaimed country areas. The observance of the lamb branding regulations by shop butchers has markedly improved. Only one sale of unbranded lamb was detected. The offending butcher was successfully prosecuted.

Butcher Shop Inspections.—The inspection of retail butcher shops for breaches of the Meat Industry Act was intensified. Some 4,150 inspections were made, compared to 2,419 in 1953-54. Minor breaches of the Meat Industry Act, relating to meat incorrectly branded, were detected at nineteen shops. The owners were warned. Several carcasses of pork illegally slaughtered were seized.

Illegal Introduction of Meat.—Two instances of the introduction of meat into the Metropolitan Abattoir Area contrary to the Meat Industry Act were detected. In one instance a butcher had been regularly selling in the area meat which he had killed outside the area at a slaughter house not licensed under the Act. His case was found proved but dismissed under section 556A of the Crimes Act. In the other instance, twenty-four sides of bacon of unknown origin and not bearing inspection stamps were seized at a city depot. These sides were confiscated by the Metropolitan Meat Industry Board.

Meat Inspection—Disease Conditions.

CATTLE.

T.B. Reactors.—The 1,212 cattle consigned, on Orders for Movement, for slaughter at Homebush Bay as positive reactors to the tuberculin test were given special post mortem inspection. Generalised lesions of tuberculosis were detected in 248, localised lesions were detected in 800 and in the remaining 164 there was no visible lesion. This represents 13.5 per cent. of "N.V.L." in all reactors slaughtered, a substantial increase over the 1953-54 figure of 9.8 per cent. "N.V.L."

Suspects.—At Flemington saleyards 2,808 head of all types of suspect cattle, including the 1,212 T.B. reactors, were under attention. Of this number 1,068 were detected at the saleyards and 528 were consigned to the saleyards on Orders for Movement. A further 216 suspects were consigned direct to the abattoir or were detected on ante mortem inspection at the abattoir.

Trichomoniasis.—Seven bulls and eight cows suspected of Trichomoniasis were slaughtered. In each case specimens of genitalia were despatched to the Director of Veterinary Research for examination.

Actinomyotic conditions.—There was a slight increase in the incidence of "actino", 1.3 per cent. of cattle at all abattoirs being affected, compared to 1.1 per cent. in 1953-54.

Neoplasms.—Condemnations of cattle at Homebush Bay for cancer were few, totalling forty-two, or 0.021 per cent. of the kill. Except for epitheliomata of the eye the most frequently observed neoplasms were neurofibromata, practically confined to aged bulls. Neoplasms involving the ovary were the most common in cows, but were rare.

Tuberculosis.—This was by far the most frequent cause of total condemnations in cattle. Some 5,000 cattle were condemned for T.B., at all abattoirs; 0.88 per cent. of the total kill. Partial were less than total condemnations. They do not include the incidence of T.B. in the gastro-intestinal tract, and localised lesions in the thoracic cavity, nor were all head condemnations recorded. Carcasses totally condemned amounted to 0.88 per cent., as for the previous year, but partial condemnations rose from 0.65 per cent. in 1953-54 to 0.83 per cent. in 1954-55.

Parasites.—*Cysticercosis* was diagnosed in three cattle. Liver fluke incidence was approximately 20 per cent. That, for the total kill, would represent a loss of livers valued at £20,000 per annum. Incidence of liver and lung infestations with hydatid cysts, in grown cattle, appeared to be relatively high. Periodic samplings revealed a fairly high incidence of

Hæmonchus and *Ostertagia*, and a number of anæmia cases in young cattle were due to infestations with these helminths. The incidence of "Pentastome" lesions (*Linguatula serrata*) appeared to be even less than in 1953-54.

PIGS.

Tuberculosis.—This is still the most common cause of pig condemnations, partial and total, and amounted to 2.6 per cent. of the pigs killed, compared to 2.3 per cent. in 1953-54.

Septic conditions.—Total condemnations for all septic conditions amounted to 0.6 per cent. of the kill, compared to 0.7 per cent. in 1953-54. The diagnosis, particularly in the case of septicæmia, is very unsatisfactory but improvement in accuracy of diagnosis cannot be achieved without laboratory facilities.

Arthritis.—Condemnations for arthritis, total and partial, increased. This condition was affecting 0.4 per cent. of all pigs killed, compared to 0.3 per cent. in 1953-54.

Parasites.—Sparganosis was rarely observed; only thirty lightly infested carcasses compared to 368 in 1953-54. No carcass was condemned for Sparganosis in 1954-55, as against sixty-eight condemnations in 1953-54. Very few kidney worm (*Stephanurus dentatus*) lesions in perirenal tissues were observed at Homebush Bay, but liver lesions suggestive of the infestation were observed. As hydatid cysts occur not infrequently in the muscle tissue of pigs all carcasses from which the liver and lungs were lightly infested were consigned to cold stores for hard freezing before release for consumption. All carcasses from which lungs or livers were heavily hydatid infested were condemned.

SHEEP.

Caseous lymphadenitis.—This was by far the most frequent reason for mutton condemnations. Total and partial condemnations amounted to 0.25 per cent. of the sheep kill at all abattoirs. There was no significant variation compared to the previous year's incidence.

Neoplasms.—These were less common in sheep than in cattle; 0.01 per cent. of sheep being found affected at Homebush Bay. The neoplasm most frequently seen was a hepatoma, necessitating the total condemnation of the carcass.

Parasites.—Liver fluke and hydatid cysts were very common in livers and lungs but no records of condemnations could be kept. *Cysticercus bovis* infestation resulted in the condemnation of eleven sheep; odd degenerated cysts were also seen and trimmed. Sarcosporidiosis infestation remained low, twenty-five sheep being condemned for it.

STOCK KILLED AND INSPECTED UNDER THE MEAT INDUSTRY ACT.

Place of Slaughter.	Type of Stock.				
	Cattle.	Calves.	Pigs.	Sheep.	Horses.
State Abattoir	200,176	121,021	157,259	2,460,490	...
Licensed Works within Metropolitan Area	72,977	6,558	25,085	1,003,638	...
Licensed Works in Country Areas	298,252	320,326	285,157	465,353	...
Knackeries	9	...	...	...	7,780
Totals	571,414	447,905	467,501	3,929,481	7,780

Country Killing Section.

This has been an important year for the Government's policy of decentralising the stock slaughtering industries.

Dubbo Abattoir.—This, the third of the series of four large-scale Country Killing Works to be constructed under the Country Killing programme, commenced operations on 25th August, 1954. The designed killing capacity per week is 7,500 sheep and lambs, 600 cattle and 300 pigs. The Abattoir is slaughtering for the metropolitan trade, as well as for local requirements. Slaughtering for export also will be carried out there.

Gunnedah Abattoir.—The foundation stone was set on 8th October, 1954. The railway siding, three cottages, and the administration and amenities buildings, are complete. A tender for the erection of the main buildings was accepted. Work on the main building is proceeding satisfactorily. This Abattoir will commence operations in 1957.

Goulburn Abattoir.—The turnover of this Abattoir, which commenced operations in May, 1951, has steadily increased from year to year. For the year ended 31st December, 1954

there was a record trading surplus of over £45,000. Stock are being slaughtered in excess of the designed killing capacity of the works. Weekly killing figures for sheep have reached 8,411 and for cattle have reached 891.

Wagga Abattoir.—This, which commenced operations in November, 1951, has also been highly successful. The number of stock slaughtered there showed a considerable increase on previous years' figures, despite some industrial trouble during the year.

Export Killing.—The Goulburn and Wagga works treat beef, lamb and mutton for the export and metropolitan markets, as well as for the respective local district. At both centres the dressing and handling standard is very high and has been praised by operators.

By-Products Sections.—The by-products sections at both Abattoirs have been working to full capacity, and the stock foods manufactured are keenly sought by primary producers in the surrounding districts.

Goulburn and Wagga Statistics.—The figures for stock slaughtered at the Goulburn and Wagga Abattoirs for the calendar years, 1952, 1953 and 1954, illustrate the increasing effectiveness of these works:—

	Year.	Cattle.	Sheep.	Pigs.
Goulburn	1952	21,788	111,101	1,131
Goulburn	1953	23,832	135,696	1,813
Goulburn	1954	25,123	231,996	2,743
Wagga.....	1952	12,021	107,721	1,522
Wagga.....	1953	17,271	120,129	1,962
Wagga.....	1954	19,462	132,728	4,144

The Cattle Slaughtering and Diseased Animals and Meat Act.—This was amended in December, 1953, to provide that the Council of any area may enter into an agreement with any person (including any other Council or County Council) conducting a slaughter-house within or outside its area whereby the Council appoints that slaughter-house as the Central Abattoir for its area or for such part thereof as may be specified in the agreement, subject to the approval of the Minister for Agriculture. A number of inquiries have been received from Councils in this connection. The first agreement under the Act, for the Municipality of Cooma, has been approved by the Minister.

Carcase Competitions.—Fat Steer Competitions were conducted in the Riverina and south-west, far north coast, Goulburn, and central coast districts. Fat Lamb Competitions were conducted in the Riverina and south-west, and Goulburn districts. Bacon and Pork Carcase Competitions were conducted in the far north coast district. The stock were slaughtered at the Wagga, Casino, Goulburn and Macksville Abattoirs.

A field day was held in association with the judging at each Abattoir. They enabled producers who entered stock to ascertain from the respective judge his reasons in respect of all carcases. By inspecting all carcases the competitors and other producers could compare the results yielded by the various methods of feeding and management.

Prize money of £100 was donated for each Fat Steer and Fat Lamb Competition, and of £50 for each Pig Competition. In addition to publicising country Abattoirs, the competitions have been valuable media for educating producers in the type of carcase required by the trade. Similar competitions have been planned for 1955-56.

Board of Tick Control.

The staff has been almost fully engaged in fencing the areas to undergo eradication. Fifty miles of new fence has been erected around the Kyogle Quarantine boundary and 50 miles of buffer fence has been repaired. On the Richmond Range the main and buffer fence have been repaired and, on the New South Wales—Queensland border, 5 miles of new fence has been erected between Mount Lindsay Gate and Glennie's Chair.

Detection of cattle tick in "clean" country involved the staff in a further fencing project of 20 miles on the Boonoo Boonoo southern boundary and 20 miles on the Cullendore boundary. This work is proceeding.

Attention has been given to the gravelling of over 400 dip yards within the eradication areas, and to extensive dip yard fence repairs. Twenty-two new dips are required in the eradication areas and work on them has commenced.

Whilst many stockowners have made their boundary fence stock-proof, in other cases it has been necessary to prosecute for failure to erect stock-proof boundary fences.

Detection of Cattle Ticks at Cullendore.—Two single tick infestations were found on properties at Cullendore, near the New South Wales—Queensland border, in February, 1955, whilst inspecting cattle in "clean" country adjacent to the Tick Quarantine Areas. The Cullendore and Boonoo Boonoo Tick Quarantine Areas were "declared" as a result, and Cullendore is being prepared with the other Areas for the eradication campaign commencing in January, 1956.

Arsenic Resistant Ticks.—Arsenic resistant strains have been found in new parts of the Kyogle and Tweed Quarantine Areas and, for the first time, at Old Bonalbo in the Bonalbo Quarantine Area and Nimbin in the Richmond Quarantine Area. To deal with the infestations dips have been charged with a D.D.T. preparation.

Tick Fever Outbreaks.—Five outbreaks occurred, three in the Tweed Section in localities adjoining the New South Wales—Queensland border where tick fever is known to occur from year to year. One of the other two outbreaks was at Green Forest in the Richmond Quarantine Area and may have arisen in lucerne hay from Schedule "S" in Queensland during the February, 1954, floods. The other outbreak was in the northern section of the Kyogle Quarantine Area. The mortality was confined to one or two animals in each case.

Charging of B.H.C. Cleansing Dips.—To protect the Richmond Quarantine Area, five dips on the Tweed Quarantine perimeter were charged with a B.H.C. preparation. Thus, any stock moving out of the Tweed Area would receive a B.H.C. treatment. A similar arrangement for all other Quarantine Areas assures that stock proceeding to "clean" country have their final cleansing in B.H.C.

Construction of Calf Dips.—This proceeded further. New dips were constructed at Lismore Saleyards, Casino Abattoirs and Byron Bay Abattoirs. Already, similar dips are operative at Kyogle and Murwillumbah Saleyards. Observations have confirmed them as more efficient than the previous, spray treatment of calves.

Investigations into Hydro-carbon Dips.—Work proceeded, to determine the settling rate of D.D.T. and B.H.C. dips, the effect of seeping, including effect on the concentration of active medicament in a dip. It is found that the settling rate of D.D.T. is so rapid that no more than ten minutes must elapse if animals are to receive an effective concentration. For B.H.C. the interval between the dipping may safely be one hour.

Estimation of D.D.T. in Milk and Cream.—The concentration of D.D.T. in milk from herds undergoing dipping in D.D.T. does not indicate a public health hazard with milk, but further cream analyses are being conducted.

Toxicology of B.H.C.—To investigate the acute and the chronic poisoning that may occur in calves receiving treatment in B.H.C., the Veterinary Research Station, Glenfield, is dipping animals at weekly and at fortnightly intervals. The animals are under close observation to detect any signs of toxic effects. No toxic effect has been observed but the trial has several months to run.

Policy Treatments.—Except in the Tweed Quarantine Area, policy treatments were drastically changed to release staff to Areas intended for the eradication campaign in January, 1956. In the Richmond Quarantine Area only a skeleton staff was left, and dips were voluntarily maintained and charged by stockowners for use. A similar policy was adopted in Kyogle and Tick Quarantine Areas West of the Richmond Range. The response by stockowners in general was not satisfactory. Only a minor percentage used the facilities. This, under the favourable seasonal conditions for tick, led to considerable tick increase in the Quarantine Areas. However, the advantages of preparing for the forthcoming tick eradication programme far outweigh this temporary increase in tick incidence.

Fencing.—Considerable emphasis has been placed on the state of the boundary fences. In all 87 miles of new fencing was erected and 82 miles was extensively repaired.

Dip Construction and Repairs.—In the Tweed Area five new dips were constructed by the tick staff, and new yards were erected at four dips. Repairs to dip yards proceeded satisfactorily in all Areas.

ANALYST'S REPORT.

Statistical.

Arsenical Concentrate manufactured, gals.	5,825
Arsenical Concentrate distributed, gals. . .	5,262½
Arsenical Dips analysed	10,860
Samples of Arsenical Concentrate for manufacturing purposes	58
D.D.T. Dips analysed	443
B.H.C. Dips analysed	360
Water samples analysed in connection with D.D.T. Dips	240
Cattle dipped in Arsenical Dips	1,156,580
Cattle dipped in D.D.T. Dips	120,210
Cattle dipped in B.H.C. Dips	181,164
Sheep dipped in Arsenical Dip	5,520

Toxicology of Arsenic.—Further work was undertaken but, due to the extra volume of work in respect of hydro-carbons, the full range of toxic standards for arsenic has not been completed.

Chlorinated Hydro-carbon Estimations.—The analyst continued to study methods of analyses to determine the active isomer in the chlorinated hydro-carbon dips. Techniques have been improved and valuable information collated on chlorinated hydro-carbons generally. Due use has been made of micro-photography.

Queensland Border Control.

Western Division.—An inspector-in-charge was appointed to the West of Mungindi Section. Previously the inspector-in-charge of the Goondiwindi Section of the border supervised also the West of Mungindi Section.

Wet conditions restricted stock movements. Winter herbage is well established.

A Departmental telephone has been installed at Collarenebri, giving the inspector-in-charge quicker notification of stock crossing the border. It enables him to determine the movements of stock for inspection prior to issue of Form 3's. Because of the distance from Collarenebri to remote crossing places, and the delay in mailing advices, stock could previously cross the Quarantine Line before advice was received.

Goondiwindi Section.—Seasonal conditions have been good, but marred by extensive February flooding. Stock which crossed the border were in good condition and appeared healthy. No report was received of pleuro pneumonia in cattle which passed through the Section. Fewer lice-infested sheep have been found at the border.

The numbers of stock dipped at the two Departmental Dips was much greater than last year's. Stock which crossed from Queensland to New South Wales totalled: cattle, 145,397; sheep, 154,273; pigs, 415; horses, 165. Stock which crossed from New South Wales to Queensland totalled: cattle, 20,943; sheep, 392,266; pigs, 144; horses, 37.

The construction of a new bridge over the Dumaresq River at Bonshaw, approximately a half-mile east of the present crossing place, has commenced. Some new fencing and a new gate will therefore be necessary at this site.

The state of repair of border fences is steadily improving, helped by the cultivation of larger areas and land-owners' erection of fences to protect their crops.

A new Departmental cottage is being constructed at Keetah, and extensive repairs are being effected to the Mungindi cottage which was seriously damaged by a cyclone.

Stanthorpe Section.—The numbers of stock from Queensland into New South Wales at the three main crossing places in this Section of the border were: cattle, 156,045; sheep, 6,275; pigs, 29,905; horses, 194. Stock crossing to Queensland from New South Wales were: cattle, 2,483; sheep, 92,384; horses, 343.

Considerable stock which crossed to New South Wales were consigned to the meat works at Wallangarra and Tenterfield, and crossed without treatment. Dipping fees were not therefore collected in these cases. Early in the year the demand for store sheep in Queensland was heavy, and large numbers were drawn from New South Wales.

In general, papers accompanying stock were in order. Queensland inspectors co-operated well. In large areas of Queensland Schedule "T", cattle tick infestation was disclosed during the year; and very close surveillance of all stock moving through was essential. It is considered that no substitution occurred and that no condition of entry was evaded.

Entry of Queensland cattle to New South Wales east of Sugarloaf Crossing ceased as from 22nd April, 1955, owing to the regazettal of Boonoo Boonoo Quarantine Area; and, in view of this Area having disclosed cattle tick infestation, Queensland imposed certain conditions on the entry of stock from there to Queensland.

Introduction of Hay, Straw, Etc.—Due to heavy cattle tick infestations in Schedule "T" and the substitution movements of hay between growers and agents within Queensland, some revision and tightening of conditions of entry of such commodities to New South Wales are necessary.

At present it is difficult to police the origin of hay. Agents handle thousands of tons and whereas the respective Agent may be situated in a clean area, the hay may be collected from widely diversified centres, some of which may be Special Areas.

Fencing.—Maintenance, but practically no repair work, was carried out. The Darling Downs Rabbit Board is renovating its fence along the Queensland border from Cottonvale to Mt. Wilson, and where the Board and the Department use the fence in conjunction the cost of repairs is being shared. The first contract, which terminates at Killarney Crossing, is nearing completion; and the second contract, in the Head-Mt. Wilson Section, is in hand.

In view of the Eradication Campaign to commence in portion of the Boonoo Boonoo Quarantine Area in 1956, and the urgent need to buffer the Queensland border fence on the correct watershed, the section concerned has been closely investigated.

Determination of the precise line is complicated and in fact a survey is required to establish the position. Meanwhile, land-owners concerned are being contacted for their permission to erect the required fencing.

Registered Paddocks.—Compliance with regulations and maintenance of fences have been good, with the exception of one holding, despite heavy floodings and consequent difficulty of keeping fences in stockproof condition.

Five new holdings have been registered and a further application is at present subject of investigation.

Dips, Maintenance, Etc.—Minor gravelling was done at Wallangarra and Stanthorpe dip yards.

The dip at Mingoola is privately owned, and is no longer available for the Department's use. The new owner of the property intends to convert it to a sheep dip. However, he will allow the Department the use of his yards when needed for the examination of stock.

The calf dip at Messrs. Tancred Bros. Meat Works, Tenterfield, was transferred to the control of the Chairman, Board of Tick Control, on 9th March, 1955.

Glenfield Veterinary Research Station.

GENERAL.

The Station area remained at 600 acres, divided into forty-three paddocks. This year 60 acres were under cultivation, 50 sown to oats, which yielded 56 tons of hay, and 10 sown to miscellaneous crops to provide fodder for small laboratory animals, rabbits and guinea pigs.

In some respects the Station's activities expanded, notably in dairy cattle and pig nutrition research. The former was advanced by the completion of the Macquarie Fields dairy and the decision that Wollongbar Experiment Farm should cease stud stock activities and be used to study dairy cattle production problems on the far north coast. In conjunction, the pigs at Wollongbar are being used for experiments which may profit significantly the economics of pork and bacon production in dairying districts.

Macquarie Fields, Experiment Dairy.—The installations, including electricity, at Macquarie Fields, have been finalised and work has commenced at the experiment dairy. The formation of a new road to serve the southern area of the Station from Macquarie Fields Railway was undertaken by units from the Army School of Mechanical Engineering. This has considerably facilitated access to that area of the Station.

Library.—The general organization of the Research Station's Library was completed. The last of the uncatalogued publications were processed with the exception of reprints in foreign languages. Seventy-two volumes were bound by the Government Printer and 50 more forwarded for binding. Although back work is now more or less complete, current work has increased, so that the librarian has difficulty in keeping up-to-date during the two to three days spent here each week.

Loans, circulations and reference work have increased and more country officers are availing themselves of the library's services.

Publications.—Thirty-seven original papers covering a wide scope of investigational work were published. This is the greatest number of original papers published during a financial year by officers for whose work the Director of Veterinary Research is responsible. Most of the papers were accepted by Australian scientific journals. One was published in *Poultry Science* (U.S.A.) and a few in *Nature* (United Kingdom). See *Appendix II*.

Field Days.—The two regular field days were held, the first for the members of the Institute of Inspectors of Stock on 29th March, and the second for the Pastures Protection Boards' Delegates on 24th May, 1955.

Asian Visitors.—A number of scientists visiting Australia under the F.A.O. or Colombo Plan Fellowships spent periods at the Station.

VETERINARY DIAGNOSTIC SERVICES.

For the second successive year the number of entries in the Specimen Register has exceeded 4,000.

Specimens Examined.	1952-53.	1953-54.	1954-55.
Cattle specimens	15,012	14,247	10,410
Sheep specimens	716	1,456	695
Horse specimens	110	107	85
Pig specimens	1,110	1,307	1,448
Poultry specimens	2,926	4,401	3,444
Miscellaneous animal and bird specimen	179	239	225
Miscellaneous specimens	710	1,201	732
Totals	20,763	22,958	17,039
Entries in Specimen Register	3,974	4,192	4,013
Inspections under provisions of Noxious Microbes Act	31	27	17

VETERINARY RESEARCH—CATTLE.

Artificial Insemination of Dairy Cattle.—Mr. P. B. Lewis, B.V.Sc. of the Western Australian Department of Agriculture, spent several weeks at Glenfield and Berry Artificial Stock Breeding Centre, acquiring the most recent knowledge in the operation and conduct of A.I. centres for dairy cattle. He considered that his New South Wales experience would prove very valuable in establishing A.I. centres in Western Australia.

Artificial Stock Breeding Centre, Berry.—It is a matter of considerable regret that the officer-in-charge of the Berry Centre since its inception, Mr. R. W. Hewetson, B.V.Sc., resigned early in March, 1955, to take up an appointment with the C.S.I.R.O. He had proved a very capable officer and his public relations with the producers of the district were of the highest order. His successor, a recent trainee graduate, resigned early in June to undertake a bovine infertility research project in the Department of Veterinary Physiology, University of Sydney. At the close of the year part-time supervision of the Centre was being maintained from Glenfield, with a lay inseminator acting as Officer-in-Charge.

Negotiations have been in progress for some months with a view to the Centre being taken over by the New South Wales Milk Board. Technical advice would still be provided by the Department.

The popularity of the service continued to increase. Over 4,400 first inseminations were undertaken as against 3,000 in 1953-54. In addition, nearly 3,000 second and third inseminations were carried out, making the total 6,900 for the year.

There have been slight variations in conception rates between different bulls and different inseminators but, overall, the conception rates have been good and on a parity with centres overseas.

Sales of semen to outside organisations were pleasing. Total number of doses sold amounted to over 3,000.

The imported Friesian bull Mooseheart Prince which proved a failure as an A.I. donor at Berry, died at Hawkesbury College. A foreign body penetration of the bull's diaphragm was confirmed on post-mortem examination.

The Toxicity of Benzene Hexachloride for Cattle.—The proposed eradication campaign in the Tick Quarantine Area has raised a problem as to the tolerance of cattle, especially calves, to the gamma isomer of Benzene Hexachloride (B.H.C.) used as the active principle in the dipping campaign.

Very scanty information is available on calf tolerance to regular dipping in this preparation. The chemical analysis of tissue for the presence of B.H.C. and the significance of the levels recovered, in interpreting toxicity, also require investigation.

An experiment was commenced in January, 1955 to obtain relevant information. Two groups of calves are being dipped regularly in a B.H.C. bath. One group is dipped at intervals of seven days and the second at fourteen days. The isomer concentration of the bath is at 0.56 per cent. Specimens are to be collected from any animal which succumbs from the treatment and these are to be analysed by the Board of Tick Control chemist. Analyses will concentrate upon the whole brain, liver, kidney, omental and renal fat, in which B.H.C. levels will be determined.

This data will help to answer the question of whether frequent and prolonged B.H.C. dipping will cause mortality; and in suspected cases of poisoning the determination of the levels of B.H.C. present in those body tissues where the compound accumulates will provide data on which to answer questions of toxicity.

Only one calf, which was being dipped at 14-day intervals, has succumbed. Analyses are not yet finalised but, from the clinical syndrome, it is doubted that the treatment caused the death.

Bovine Trichomoniasis.—During this twelve months, *Trichomonas foetus* infection in cattle has been detected in dairy herds in a number of districts. With the passage of time and improvements in methods of diagnosis, it is becoming apparent that this infection is widespread in New South Wales.

This Station's investigation has added a lot to the knowledge of this disease. The finding of at least one of the sites in the genital tract of the cow where the infection can persist during the life of the animal has thrown considerable doubt on the previously accepted idea that infection in the cow can be corrected by some three to four months sexual rest.

A cow which had shown the infection from the 10th to the 61st day after service by an infected bull ceased to show *T. foetus* at the sixty-first day. Eleventh weeks after showing the last positive vaginal smear, a cyst was detected in the Gartner canal of the vagina. The contents of the cyst were found to contain very large numbers of *T. foetus*. Coincidentally, the vaginal smears had given a negative reaction for the previous eight weeks. In consequence of this observation a survey for Gartner canal cysts is being undertaken at the State Abattoir.

The effect of glycerol and low temperature on *T. foetus* has been studied. It has been found that the organism will survive low temperature storage in glycerol concentrations ranging from 5 per cent. to 15 per cent. These findings are at variance with the work of Joyner in the United Kingdom.

If semen from a trichomonas infected bull is to be rendered, by low temperature storage, safe for artificial insemination, the diluted sample should contain not less than 10 per cent. glycerol and it should be equilibrated for at least 16 hours. Glycerol at 20 per cent. level is effective against *T. foetus* but deleterious to the sperm.

During the year, the Station had the advantage of a few weeks' visit by Dr. Allan Pearce who is visiting Australia from the University of Cambridge. Dr. Pearce had worked extensively on *T. foetus* in the United Kingdom.

Leptospirosis.—The serological survey of cattle and pigs for leptospiral agglutinins, in co-operation with Dr. Forbes of the School of Public Health and Tropical Medicine, has continued.

Over a two-year period ending 30th June, 1955 some 487 pig sera from 72 separate piggeries in various districts have been examined. Considering an agglutination titre of 1/300 as indicative of either past or present infection, then no less than 122, or approximately 25 per cent., were positive to *L. pomona*. In addition, 47 sera, or 9.6 per cent., reacted to *L. hyos*.

Sera from sows on 26 piggeries where abortion and/or neonatal losses had occurred, were examined. All proved negative for *Brucella* agglutinins, but Leptospiral agglutinins were detected in sera from 21 of the 26 properties. This sero-

logical evidence strongly suggests that leptospire are primarily responsible for swine abortion and neo-natal losses in this State.

The 21 affected piggeries were situated in the Tweed-Lismore (6), Casino (3), Inverell (1), Armidale (1), Tamworth (1), Moss Vale (2), Molong (1), Mudgee (1), Carcoar (3), and Hume (2) Pastures Protection Districts. That indicates the widespread distribution of the disease.

Leptospiral abortion generally follows the introduction of infected animals into the herds. Aborting sows usually carry their subsequent litters through successfully. The use of antibiotics in preventing leptospiral abortion is at present under test.

In the last twelve months, sera from 573 cattle have been examined and 108 have shown leptospiral agglutinins to a titre of 1/300 or greater. Of the 108 reacting sera, 99 were positive to *L. pomona*, 7 to *L. hyos* and 2 to *L. grippotyphosa*. Nine outbreaks of leptospirosis in calves were confirmed, either serologically or by demonstrating the organism in preserved tissue, as being due to *L. pomona*. The outbreaks occurred in the Lismore, Casino, Armidale, Hume and Albury Pastures Protection districts.

Milk Fever Complex.—This project, more accurately "Metabolic Diseases of Dairy Cattle" has proceeded along two broad lines, viz., the defining of the syndromes as indicated by blood samples from the field cases, and by fundamental biochemical and histopathological studies of the mechanisms involved in these diseases.

- (a) *Fractionation of serum calcium.*—A variety of techniques has been investigated, to find a satisfactory method for determining ionised calcium in serum. The appearance of a number of variables has precluded finality.
- (b) *Effect of Dihydrolachysterol (A.T. 10) administration to dairy cows.*—This project has been in abeyance, but may be reopened in the coming year.
- (c) *The prevention of milk fever by phosphatic supplements.*—This experiment was undertaken on the Jersey herd at Yanco Experiment Farm, in which a high incidence of milk fever had existed.

A supplement of monosodium phosphate was fed in a concentrate mixture to one group of cows for two weeks prior to calving. A second group was fed identically except that monosodium phosphate was omitted. Incidence of milk fever was lower in the phosphate group but, biometrically, not significantly. The experiment indicated that increasing age of the cow has an influence on the incidence and severity of the disease. It has led to an investigation of the possible age change in the parathyroid glands. Studies have now commenced on the cytology of these glands. This field of knowledge is singularly deficient.

VETERINARY RESEARCH—SHEEP.

Mycotic Dermatitis.—The field dipping trial in progress at the close of last financial year was terminated in October, 1954. A system of scoring was adopted to assess the extent of the infection in the experimental sheep. The sheep had been divided into four groups. One group was dipped in the Sulphadip and Rusept, one in sodium o-phenyl phenol and sodium dihydroxydichlorodiphenyl methane, one in trichlore methane, and the fourth group was untreated. Compared to the controls the treated sheep did not show any significant response.

Two proprietary preparations, Youngs W.C.D. Dip and Taubmans D.D.M. were tried on an infected flock in the Tamworth district. The rate of recovery in the treated sheep was not significantly different from the untreated controls.

Ovine Brucellosis.—The condition, only recognised during the last two years as a specific infection of sheep, was described in the 1953-54 Annual Report.

Investigations this year suggest that the disease has not a high incidence in New South Wales, although the State carries half the sheep population of the Commonwealth.

The most important finding is that all rams showing gross lesions of epididymitis are not in fact cases of ovine brucellosis. Rams have been received at the Research Station showing well advanced enlargement and apparent fibrosis of the head and tail of the epididymus which have proved negative, both serologically to ovine brucella and by bacteriological examination of the epididymus.

Observations are being undertaken in a central tablelands Dorset Horn stud where the disease exists. Sires used during this season's mating were devoid of any abnormality of the

testes at the commencement of the season. At the conclusion of mating three of the rams were serologically positive reactors to ovine brucella. It is proposed to determine the status of the ewes as venereal transmitters of the infection.

Ovine Pregnancy Toxæmia.—Research continued, on the pathogenesis and treatment of ovine pregnancy toxæmia.

Two further experiments have produced confirmatory evidence that the condition is the result of a hypoglycæmia encephalopathy. Early cases of the disease have shown a successful response to treatment with glycerol per os and glucose subcutaneously.

Further studies with insulin induced hypoglycæmic encephalopathy have confirmed the similarity between this syndrome and naturally occurring cases of pregnancy toxæmia. It has been possible by the use of insulin to depress blood glucose levels to those of naturally developing pregnancy toxæmia.

A decrease of intracellular cerebral potassium has been detected both in pregnancy toxæmia and hyperinsulinism. This may be the explanation so far undetermined, of the failure of advanced cases to respond to treatment.

Cerebral metabolism in the sheep has been studied. The sheep's brain, unlike the peripheral tissues, is unable to utilise acetate. Apparently glucose is the major or even the sole metabolite. The effect of adrenalin on the cerebral blood flow has also been determined, and a method for blood adrenalin estimations is being developed to investigate the role of adrenalin in the response of sheep to insulin.

Ovine Hypocuprosis.—The feeding experiment, involving the induction of hypocuprosis, was continued until the liver copper concentration of sheep receiving molybdenum and sulphate supplements had declined to a steady level of about 10 parts per million. Over this period the blood copper concentration of these sheep was depressed to a mean level of 0.03 mg. per 100 mls. Dystrophic wool and hypochromatrichis was evident in the sheep for the second half of the fifty weeks of the experiment.

A feature of the investigation was that the diet of the hypocupritic sheep was designed to reproduce approximately the mean copper, molybdenum and sulphate status of the pasturage in an area of New South Wales enzootically affected with hypocuprosis, and that, at least in this area, the hypocuprosis is explicable in terms of copper-molybdenum-sulphate interaction.

In experiments to ascertain the effect of vanadium, tungsten and zinc, in the diet of sheep on a high sulphate intake, no significant change in liver copper concentration was observed.

Investigation of the distribution of copper in the blood of normal and deficient sheep has indicated that a determination of the copper-containing oxidase enzyme in serum is a useful aid in the diagnosis of hypocuprosis.

Toxæmic Jaundice (Chronic Copper Poisoning and Heliotrope Poisoning).—Although the name toxæmic or enzootic jaundice embraces two distinct disease conditions of sheep, the specific diagnosis of heliotrope poisoning or copper poisoning frequently must await chemical analysis and histopathological examination of specimens in the laboratory. Consequently, it may be wise to retain the term toxæmic jaundice for tentative field diagnoses where it is uncertain which of the two agents is responsible.

This year, specimens from cases in 16 outbreaks of toxæmic jaundice were received at the Station. A tentative field diagnosis of heliotrope poisoning was made in 8 of the 16 outbreaks. The eight mortalities occurred in the Carcoar (4), Forbes (2), Gundagai and Narrandera P.P. Districts. Laboratory confirmation of six of the eight diagnoses has been made. Examination of the other two has not been completed.

The most severe losses occurred on one of the Forbes properties where 100 of 700 crossbred ewes died between May and August, 1954. This flock had had access to a heavy growth of heliotrope during the previous summer.

Five outbreaks of suspected chronic copper poisoning were reported, from Gundagai (2), Young, Deniliquin and Bathurst districts, but to date only one has been confirmed. All losses occurred following grazing on subterranean clover pastures. Losses, with symptoms of jaundice, were also reported from three other properties, in the Wagga, Mudgee and Hume districts, but prior drenching with carbon tetrachloride may have precipitated the losses. Specimens from two of these outbreaks have not yet been examined.

Some field evidence is available suggesting that *Chondrilla juncea* (skeleton weed) might possess hepatotoxic alkaloids similar to those of heliotrope. Examination of mature plants of skeleton weed failed to reveal the presence of alkaloids but, since the seedlings are reputedly more toxic, collections of the young plant in the rosette stage were made from a number of properties. These examinations have been completed, and it has not been possible to demonstrate any appreciable alkaloid content in the young plant.

Bulk samples of *Echium plantaginaem* (Paterson's curse) were again collected so that greater quantities of alkaloid could be extracted and used in purity for laboratory studies.

VETERINARY RESEARCH—POULTRY.

Heramitiasis of Turkeys.—The incidence has been very low this year. The causal protozoan *Heramita meleagridis* can remain as a source of infection in the droppings from carrier birds, and the number of protozoans in the faeces is closely related to the mortality rate. The adoption of daily removal of droppings during an outbreak has proved of value in reducing the incidence.

Treatment of affected birds with 3 per cent. dried whey powder in 1 : 2,000 copper sulphate and the use of antibiotics, notably Bacitracin, have given promising results.

Mange in Turkeys.—This condition in growing turkey poults was encountered for the first time in Australia. It attacked birds from 2-6 weeks old. Mortality was as high as 60 per cent. The causal mite *Epidermoptes bilobatus* produces a thin white scaly condition of the skin; the feathers are ruffled and the birds scratch themselves continuously.

Avian Monocytosis.—Described in U.S.A. as "Mud Fever" and affecting adult turkeys this occurred in the Young district. The affected birds manifested a sour crop, with diarrhoea, and darkening of the head. At post mortem the kidneys were swollen and pale, and the intestinal tract was congested. Birds respond to treatment with molasses, potassium chloride and antibiotics.

Pullorum Disease.—In the United Kingdom, claims of great promise have been made for a new drug, Furazolidone, in eliminating infection from Pullorum-carrier hens and for treatment of chickens. Supplies of this drug have been made available to the Research Station. An experiment is in progress to examine the efficiency of this preparation against *S. pullorum* infection.

MISCELLANEOUS PROJECTS AT GLENFIELD V. R. STATION.

Rabbit Myxomatosis.—This infection in the rabbit population of the State has resulted in a very spectacular reduction in rabbit numbers.

The late winter and early spring of 1954 were particularly dry, throughout a considerable area of New South Wales, and rabbits were breeding whilst the reducing effects of myxomatosis were light. This was due to ecological conditions unfavourable to insect vectors, notably various types of mosquitoes. Although some rabbit breeding occurred the pest did not at any time attain serious proportions. This was clearly apparent from the tonnage of rabbit skins offered at auction in Sydney. The tonnage for the year was just under 700, a decline of some 10 per cent. on the 1953 figures.

The demand from stockowners for the virus has been remarkable steady, in spite of the reduced rabbit population, and amounted to 280,000 doses. This was slightly in excess of 1953-54 demand.

Good rain in October and excessive falls throughout the summer, created ideal conditions for blood-sucking insects. Concurrently, myxomatosis infection operated as a pandemic in the relatively sparse rabbit population. High grade kills were widespread.

The most interesting feature was the occurrence of virulent infection in districts, notably the coastal and near coastal country between the Hastings and Manning Rivers, where spectacular effects previously had not been seen. Performance on the higher Monaro country was poor; especially above the 4,000 ft. altitude. In New England high grade kills occurred.

Quite definitely, at the present time New South Wales is carrying the smallest rabbit population known to this century. For the first six months of 1955 the tonnage of rabbit skins offered at auction in Sydney was 122, a 57 per cent. reduction on 1954 for the same period, and a 94 per cent. reduction on average tonnage sold during the first six months of the eight years prior to the release of myxomatosis.

Manufacturers using rabbit fur, notably furriers and felt hat manufacturers, are paying very high prices at auction for skins and are disturbed at the uncertainty of future supplies.

There should be a substantial lift in the weight of wool produced per head of sheep over the next wool selling season.

Tuberculosis Survey—Humans—Typing of Mycobacterium Cultures of Human Origin.—Because the preceding year's examinations had shown that all cultures supplied from human patients contained tubercle bacilli of human type, it was felt that perhaps bacteria of bovine type were being missed—being more difficult to cultivate.

Accordingly, arrangements were made in July, 1954, for material suspected of containing tubercle bacilli to be forwarded to Glenfield for examination. Only specimens from country hospitals, or from selected patients in metropolitan hospitals presumed to have been infected in the country were sought. It was considered that bovine infections would be more likely to be contracted in non-metropolitan areas, where milk is not pasteurised. In particular, material from children was requested.

The response was much less than hoped. Only eighty-eight specimens were received. The great majority were of sputum, a few of urine, gastric contents, etc. Much of this material showed no tubercle bacilli, and all positive cases proved to be of human type.

In addition, the examination of cultures isolated at country hospitals was continued. These, too, were all of human type.

A number of cultures of mycobacteria forwarded from human patients, though morphologically like tubercle bacilli, proved not to be that organism. These mycobacteria were in general non-pathogenic for guinea pigs, though some formed slight non-progressive lesions in that animal.

Though early colony formation of these organisms often simulates that of tubercle bacilli, the cultures usually develop later characters quite unlike that organism, and not a few will grow at room temperature. The presence of acid fast organisms other than tubercle bacilli, in material from human patients, has long been recognised.

NUTRITION RESEARCH FROM GLENFIELD LABORATORY.

The Protein Content of Mature Native Grasses.—To obtain some data on the protein content of paddock roughages available to sheep, a survey based on fifty samples of pasturage from various parts of the State was undertaken. The mean, crude protein content was 3.95-0.24 per cent., the range of values being from 1.4 per cent. to 8.1 per cent.

Copper Deficiency in Cattle.—Further investigations on the north coast have shown that copper deficiency in cattle is fairly widespread, especially on the low lying country at the mouths of the Richmond, Clarence and Macleay Rivers. The condition has been detected in beef and dairy herds. Two trials are in progress on private properties, comparing different methods of treatment.

Sodium Chloride Metabolism in Sheep.—Investigations on the sodium chloride metabolism in sheep were continued. These were initiated to provide some fundamental knowledge of the much debated question of salt requirements for sheep.

Two groups of ten young sheep have been studied for six months. One group was fed on a diet very low in sodium, viz., wheat. The second group received a supplement of 0.5 per cent. salt. The results showed that:—

The salt supplementation had no effect on the weight gains or on maintenance of weight.

The levels of serum electrolytes (sodium, potassium, chloride) were unaffected by six months' sodium deprivation.

Sodium deprivation did not reduce plasma volume as might be expected.

Sodium and chlorine balance studies, on the pattern of excretion, did not yield conclusive results.

The bone sodium reserves are being investigated to ascertain whether the stored sodium is gradually utilised during periods of sodium deprivation.

Concurrently, a survey of fodder and pasturage from various parts of the State showed that chlorine was adequate in all feeds. All grains were low in sodium but most samples of pasture and hay contained adequate amounts of sodium, indicating that salt deficiency is unlikely to occur in grazing sheep.

Pellet Feeding of Sheep.—Investigations of pellet feeding of sheep, which is developing rapidly, showed that this form of feeding can be undertaken with safety, providing the initial quantity offered is not excessive. Sheep take longer to become accustomed to pellets than to grains.

Drought Feeding, Research in Sheep.—The co-operative, drought investigational work with officers of the C.S.I.R.O., Division of Animal Health and Production, continued in the Burdekin Unit at Glenfield.

The study of the rate of loss of condition and incidence of mortality in Merino ewes on drought maintenance and sub-drought maintenance rations has been completed. Groups of three-year-old Merino ewes were fed rations providing 4.0, 3.0 and 2.0 lb. starch equivalent per head per week, fed at either daily or weekly intervals. In addition the group receiving 4.0 lb. S.E. per head per week received a supplement of 0.5 per cent. salt.

Over the period of 223 days, 27 per cent. of the ewes in the 2.0 lb. S.E. group died. Only two sheep in the 3.0 and 4.0 lb. S.E. group died. The body weight of the 4.0 lb. S.E. group remained constant, whilst the 3.0 lb. S.E. group lost an average of 9.5 lb. over the first eleven weeks and thereafter remained constant.

The addition of 0.5 per cent. salt had no effect on food economy or wool production.

Observations continued on Merino wethers' utilisation of low quality roughage plus a small supplement. A mixture containing 18.9 per cent. crude protein was fed to one group at the rate of 4 oz. per head per day.

The results have shown that the 4 oz. of supplement considerably improved the performance of the wethers in comparison to those receiving no supplement. There was a significant increase in survival rate, body weight, wool production and roughage consumption.

Experiments have been undertaken on the relative efficiency of absorption of a Vitamin A supplement given as the oil, the emulsion and water-soluble suspension. The subjects used were Merino wethers.

The work showed that in the progressive development of Vitamin A deficiency, night blindness is the first clinical symptom detected. It can be readily detected by placing obstacles in the way of the animals at dusk. Those with adequate night vision readily negotiate the obstacles.

POULTRY NUTRITION RESEARCH.

Value of Low Protein Wheat and Bone Meals for Laying Hens.—The value of low protein mealmeals is being investigated. Diets have been compounded in which equal amounts of protein are provided by 40 per cent. protein and 50 per cent. protein mealmeals. Each is being fed to 150 laying hens. The first month's production showed a trend, in that 40 per cent. protein groups yielded 1,480 eggs and the 50 per cent. protein mealmeal groups 1,860 eggs.

High Efficiency, Broiler Diets.—This is being investigated from two different aspects:—

(a) **Protein and B. vitamin concentrates:** Lucerne meal has been shown to produce a small growth response in a wheatmeal-meatmeal diet, but buttermilk powder was more effective than lucerne meal in lucerne meal plus 0.1 per cent. methionine. Buttermilk powder produces a better response than livermeal in a high efficiency diet. The combination of buttermilk plus livermeal is better than buttermilk.

(b) **The Effect of Methionine Supplementation:** The value of methionine as a commercial additive to diet is being investigated. Methionine deficiency is a limiting factor to chicken growth and feed efficiency in diets based on wheatmeal, meatmeal and vitamin B concentrates. Successful diets using such methionine-rich supplements as buttermilk powder and livermeal have been formulated and tested. The addition of methionine or choline to simple wheatmeal, meatmeal, and whey powder diets produces a folic acid deficiency. White Leghorn chickens require far larger quantities of methionine than Australorp chickens due to the faster feathering of Leghorns and the probable resultant heavy drain on sulphur amino acids.

Detergents and Antibiotics in Diets.—Alkyl amyl sulphonate at the rate of 0.3 per cent. was fed in a high efficiency diet with and without procaine penicillin. A marked growth stimulus was obtained at six and twelve weeks. No response occurred in a "low efficiency" diet. Further work is proceeding.

Shannon Vale Nutrition Station.

A Field Day was held at this Station on 30th September, 1954, and, in spite of wet cold weather which interfered with paddock inspections, the attendance was sixty.

The long range experiment, comparing the performance of two Merino flocks respectively grazed full time and half time on sown pastures, is continuing, using females only.

The latter part of the 1954 winter was very dry, and although supplementary feeding was common throughout New England at that time it was not necessary at Shannon Vale Station. This was despite the stocking rate, throughout the period, of 1.7 sheep per acre. The rainfall in October exceeded 9 in. and a phenomenally lush season has prevailed since.

Intestinal parasites have been troublesome throughout the summer and autumn, and young sheep have not thrived. Mowing of a number of paddocks and baling of grass hay were undertaken for pasture control. Some 1,000 bales were conserved but the quality is not good, because of unsatisfactory weather at baling time.

An additional 5 acres has been sown to cocksfoot and clover, which brings the sown area to 300 acres, half the area of the Station.

The grade Romneys were again mated to Southdown rams for a November lambing. This year Cheviot x Romneys, grade Romneys and Romneys x Merino have been added to the flock, for a study of development under good nutritional conditions.

Trangie Agricultural Experiment Station and Wool Laboratory.

It has not been possible to attract an applicant with the required specialised knowledge and experience for the position of Officer-in-Charge of the Wool Research Laboratory. The staff position at the Laboratory became further involved when Messrs. Lockhart and Tomlinson were killed in an aircraft disaster at Narromine on 14th May, 1955. Since the beginning of 1954, Mr. Lockhart had been engaged on a post graduate project under Professor P. R. McMahon of the University of Technology, and at the end of this year would have submitted his thesis for Ph.D. Mr. Tomlinson, since graduating in Veterinary Science from Sydney, had undertaken specialisation as a liaison extension officer in wool and sheep husbandry between the producer and the laboratory. The fleece sampling service from Trangie was to commence at an early date. The loss of these two officers, with their specialised training, will seriously retard the Trangie programme.

Breeding Experiments.—These experiments, of long range nature, have continued. The six groups are constituted on selection for fleece plus and fleece minus, crimps per inch plus and minus, the "Index Flock", which is selected mainly on freedom from skin folds and maximum fleece population, and the Merino stud flock.

At the 1954 shearing the selection groups showed the expected differences and the "Index Flock" compared favourably to the stud, having slightly higher clean fleece weight, longer staple and lower fold score.

The lambing figures in all groups during 1954 were remarkable for Merinos. At the autumn lambing 118 per cent. lambs were born, 103 per cent. were mothered at 1-3 days, and 95 per cent. were marked. A high proportion of twins was born; 28 per cent. successfully mothered; 15 per cent. of ewes were dry. The high percentage of twins led to increased lamb losses from predators, notably crows.

Co-operative Grazing Trial.—This experiment, commenced in 1948, has been terminated. The results have been prepared for publication. The most important finding was that throughout the seasons during the experiment, and they were not typical of the Trangie environment, grazing at the rate of one sheep per acre gave the highest wool return per acre without damaging the natural pasture.

The second phase of the investigation will commence during 1955-56, when comparisons will be made of grazing natural pasture, natural pasture plus 11 per cent. lucerne and natural pasture plus 33 per cent. lucerne.

The area was subjected to a flood of record proportions during February, 1955.

Wool Metrology.—The late Mr. Lockhart had been investigating the development of staple crimp, weathering of the fleece, handle, and the reaction of the fibre to varying levels of nutrition.

It would seem that staple-crimp in wool is the resultant of forces which are attempting to make the fibres parallel. A finding of considerable interest is that wools with a clearly defined crimp have, on the average, a lower fibre diameter than would be expected from the number of crimps-per-inch.

Weather staining of the fleece is affected by the weight of clean wool per unit area and the quantity of suint in wool. Damage is at a minimum in high, clean fleece weights and white wool.

The main determinant in the handle of wool is mean fibre diameter.

Fertility Studies.—A further experiment was undertaken to examine the effect of Benzene Hexachloride jetting on ram semen quality. The results did not substantiate the previous observation that this treatment affected sperm numbers, morphology or motility.

Observations are in progress to determine the effect of over-fatness in ewes, on general fertility.

"Face Cover" Studies.—Studies of the effect of "face cover" (wool on the face) on fertility and wool production have yielded interesting information. Ewes with very woolly faces cut less greasy wool and produce less lambs, of lower weaning weight, than do open faced ewes. The same result is obtained if the wool on the face is kept short.

At each mating the Station artificially inseminates a percentage of the ewes, and considerable information is accumulating on the application of this method of breeding to the Merino ewe.

Sheep Nutrition Research.—The project designed to study the effect of early nutrition on subsequent growth, body size, wool production, and fertility, and to examine the importance of genetic environmental interactions, has continued.

The sheep on the high plane produced 2.4 lb. of wool above the low plane animals.

The sire whose progeny gave the best clean fleece weight under the high plane conditions was the worst performed under the low plane conditions. The sire whose progeny gave the best performance under the low plane conditions was the worst under the high plane conditions.

Poultry Experiment Station, Seven Hills.

The inability to obtain a second livestock research officer (poultry), has handicapped the research programme at Seven Hills.

Breeding Improvement Plan. Recurrent Reciprocal Selection.—Following the first testing period, the second selections of six White Leghorn and five Australorp lines were made. These were then crossed within each breed to produce fifteen new White Leghorn and ten new Australorp lines. Twenty cockerels, one from each selected White Leghorn line and one from five unselected White Leghorn lines were mated with each Australorp line for the second, 500-day performance selection. Seven hundred and ninety crossbred pullets have been housed, half in small units and half in large flocks.

Back Crossing White Leghorn x Crossbreds.—Examination of data from back cross hens indicates that little hybrid vigour is lost in the back-cross.

Some Other Research Projects, Located at Experiment Stations and Farms.

At Wollongbar Experiment Farm.—Since the decision to transfer the Stud Guernsey Herd from Wollongbar and concentrate the facilities of the farm upon investigation of production problems of the dairy, pork and bacon industries of the far north coast, the following projects have been commenced.

1. A comparison of the performance of pigs fed meal and green feed *versus* meal and vitamin A.
2. The value of concentrate feeding for cows grazing summer and autumn Kikuyu pastures.
3. A comparison of early weaning (13 weeks) and late weaning (26 weeks) of calves reared on skim milk and pasture.

Beef Cattle, Horses and Goats Section.

The principal livestock officer is overseas as a member of the Stud Stock Buying Delegation. A special veterinary research officer (beef cattle) has been appointed to the section and has deputised for the principal livestock officer whilst the latter is overseas.

Two cadet livestock officers (beef cattle) have been appointed and, on completion of training at Hawkesbury College, will take up full time duties at the beginning of 1956.

The principal livestock officer is Departmental representative in the following organisations:—

Commonwealth Clydesdale Horse Society,

Arab Horse Society of Australia,

Aberdeen Angus Society of Australia,

Poll Shorthorn Society of Australia,

Goat Breeders' Society of Australia,

Technical Sub-Committee on Beef Cattle Production, Committee of the War Service Land Settlement Commission for the allocation of gift bulls to soldier settlers.

At the Annual General Meeting of the Arab Horse Society of Australia, the principal livestock officer was elected Chairman of the Advisory Committee.

BEEF CATTLE.

Stud Beef Cattle.—Aberdeen Angus beef cattle studs continue to be maintained at Trangie Agricultural Experiment Station, Grafton Experiment Farm and Hawkesbury Agricultural College. It is intended to commence stud breeding at Duck Creek, sub-station of Wollongbar Experiment Farm. Application has been made to the Secretary of the Aberdeen Angus Society for the recognition of this stud. Commercial breeding operations will also continue at Duck Creek.

A small team of seven animals from Trangie comprised the Departmental exhibit of Aberdeen Angus cattle at the 1955 Sydney Royal Show. It is doubtful that more attention has ever been centred on Erison of Harviestoun (imp.) than during this Show. This was by virtue of the excellent progeny which represented him. Thirteen prizes were won by these cattle, including the Champion, Reserve Champion, and Junior Champion Awards, three 1st prizes, one 2nd, four 3rds and two Special prizes.

Cattle were also shown, non-competitively, at Trangie Show.

Three additional females arrived for the Poll Shorthorn stud at Wagga Agricultural College and Experiment Station. The contract work on the new yards and fittings has been completed. Already, use is being made of the cattle scales. Informative records on growth rate and other measurements are envisaged.

Commercial Beef Cattle.—The Department entered three Aberdeen Angus steers in the 1955 Sydney Royal Show. Two of these were from Trangie and one from Hawkesbury Agricultural College. When judged on the hoof, one was awarded a 3rd prize. On the hook in the carcass section one 1st and one 3rd prize were gained.

Growth Rate Studies.—Beef cattle investigations concerned with growth rate, of growing and fattening stock on pasture, continued at Lecton Experiment Farm and at Belabula Farms, Canowindra. These are part of the Department's contribution to the work sponsored by the Technical Sub-committee on Beef Production and the Australian Meat Board. A report on these observations has been collated, with those from other centres throughout southern Australia, by Dr. M. C. Franklin of the C.S.I.R.O.

At Lecton the third group of steers and heifers is reaching market weight (950 lb.). Carcasses are appraised. The fourth group of 30 weaners has arrived from Duck Creek.

At Canowindra excellent growth rates were recorded. The first group of 60 steers weighed 549 lb. and this year's group of 66 steers weighed 587.5 lb. when weaned at 7-8 months of age. The first group were marketed at approximately 960 lb. live weight when only 14-16 months of age. This supported the Department's contention that in the better pasture areas cattle can be marketed at 1,000 lb. live weight before two years of age.

The current group of 66 steers has been further divided, for three different treatments, to ascertain the value of supplementation.

Beef Cattle Breeders' Competition.—The 3rd Beef Cattle Breeders' Competition was held during 1954-55, jointly conducted by the Agricultural Bureau of N.S.W., the Rural Bank of N.S.W. and this Department. The Competition was conducted in ten districts; district winners being eligible for the

State Championship. Well attended district field days on the occasion of the final judging were an important part of this competition. A Junior Farmer Judging Competition was held in conjunction with these field days.

Beef Cattle Carcase Competitions.—The principal livestock officer was Judge in three of the Fat Steer Carcase Competitions held in association with Country Killing Works, and addressed well attended field days on these occasions.

HORSES.

Breeding.—Horse breeding continued at Wagga Agricultural College, Hawkesbury Agricultural College and Trangie Agricultural College and the remainder from Hawkesbury Agricultural College. The following prizes were awarded:—

Reserve Champion Arab Stallion and Champion Stallion
2 years old and under 4 years.

Champion Arab Mare.

Mares 4 years old and over—1st, 2nd and 3rd Prizes.

Mare or Filly, 2 years and under 4 years old—2nd and 3rd Prizes.

Brood Mare, 3 years old and over—2nd and 3rd Prizes.

The Department has won championships on several occasions since first exhibiting Arab horses in 1949, but this is the first time that a championship has been won with a horse of the Department's own breeding.

GOATS.

On 31.5.1955 there were 74 Saanen and 21 Toggenburg goats at Condobolin Experiment Farm.

The does in both studs at Condobolin have been herd-recorded for the fourth successive year. Thirty-nine does were recorded in 1954-55; 25 in 1953-54; 18 in 1952-53; 15 in 1951-52.

Demand for stud bucks of both breeds still exceeds our supply. Of the 19 animals sold, 3 went to Victoria and 2 to Queensland.

A team of 12 female goats (9 Saanen and 3 Toggenburg) was exhibited at the 1955 Sydney Royal Show. For the first time it was possible to bring a trio of milking Toggenburg does to the Royal Show. These attracted a lot of interest. They were placed second to the Departmentally-owned Saanen trio.

The Departmental exhibit was an unqualified success, procuring the following prizes:—three Champions, eleven 1st prizes, ten 2nd prizes, four 3rd prizes and one Special prize.

EXTENSION WORK—BEEF CATTLE, HORSES AND GOATS.

A field day was held at Leeton Experiment Farm on 13th August, 1954, to explain the beef cattle investigations there and the general problems of beef cattle raising in the Irrigation Areas. It was well attended, and the lectures and demonstrations at the Farm and, subsequently, in the South West Co-op. (Yanco) Meat Works, were well received.

Officers gave lectures on matters relating to beef production at various centres, including Oberon, Wallabadah, Deepwater, Newbridge, Curvan, Bombala, Finley, Tullibigeal, Ando. The principal livestock officer addressed the Annual State Congress of the Agricultural Bureau and gave a demonstration on beef cattle breeding.

Several radio broadcasts were recorded; and were used by the Australian Broadcasting Commission's national and regional stations, as well as by commercial stations.

Apiary Section.

A livestock officer (apiculture) was transferred to the Southern Region, Wagga headquarters, and one also to the central western districts with headquarters in Bathurst. One livestock officer (apiculture) position is vacant. An apiary inspector has been employed in northern districts for the past six months. His further employment has been approved because of the occurrence of American Foul Brood disease in

those districts. The disease is very rare in Queensland, and, because much of the honey produced in the northern districts is marketed in Brisbane, the desirability of permanently stationing an inspector in the north is obvious.

The past honey season has been about average. The wet autumn affected flowering of the important eucalypts, and the yields were lower than anticipated.

Bee Diseases.—American Foul Brood (*Bacillus larvae*) has not been as serious as in the preceding two to three years. However, minor outbreaks occurred over a wide area, including Inverell which is the most important honey producing centre in the north-west. Prompt action by Departmental officers and the co-operation of bee-keepers prevented a heavy toll of hives.

One outbreak of American Foul Brood, involving a large number of hives, occurred in the metropolitan area. The bee-keeper failed to recognise it in its early stages and thought ants were destroying his colonies.

Apiaries Act, 1916-44.—Departmental officers have carried out inspections of apiaries to ensure that bee-keepers are complying with the requirements of the Apiaries Act.

Bee Research.—The apiary instructor and officer in charge of the bee breeding programme, Hawkesbury Agricultural College, visited Lawes Agricultural College, Queensland, to study work being carried out there.

The bee-breeding programme at Hawkesbury Agricultural College involves the artificial insemination of queen bees in controlled mating. Work on the production of improved strains of vigorous hybrids at Hawkesbury is proceeding satisfactorily despite delays caused by unfavourable seasonal conditions. It is anticipated that by next season the work will be at the stage of crosses between the developed inbred lines. These will then be compared to existing strains of bees.

Importation of Queen Bees.—The Department again imported Queen Bees from overseas for breeding purposes, and to compare them to existing strains.

Queen Bees from Departmental Apiaries.—Queen bees were sold to apiarists in this State and overseas.

A specially prepared nucleus colony was sent to West Thailand for breeding purposes.

Summer School for Beekeepers.—A very successful Summer School in Apiculture was held at Hawkesbury Agricultural College in January, 1955. This is the first such school at Hawkesbury for four years. Unfavourable seasonal conditions prevented others.

Extension Services.—Officers of the Apiary Section have actively acquired photographic material for use in apicultural extension work. The resultant wide range of kodachrome and black and white 35 mm. transparencies is enhancing the service. Many of the photographs will prove of great value in the preparation of new and revised Departmental literature.

The principal livestock officer (apiculture) visited most of the important honey producing centres of the State and addressed general meetings of beekeepers. The talks were illustrated with 35 mm. colour transparencies, which occasioned favourable comment for their effectiveness.

Demonstrations.—Departmental Officers were prominent in arranging and conducting bee handling and honey extracting demonstrations at the Sydney Royal Show, in co-operation with the Commercial Apiarists' Association. The demonstrations were held ten times daily and were well received by the public.

The Commercial Apiarists' Association was also assisted in staging Honey Week, 9th to 13th May, 1955. This was designed to increase sales of honey on the local market. Articles and material were supplied for radio and press publicity. Selected photographs were loaned to various journals and magazines for use with articles featuring honey and bee-keeping. The home market gives a greater return to the bee-keeper and efforts are being made to stimulate consumption of honey in Australia.

Statistics of the Apicultural Services—

	1953-54.	1954-55.
Lectures and Demonstrations	32	40
General Inspection of Apiaries	660	850
Apiaries Infested with Wax Moth	33	29
Apiaries Infested with Brood Disease	46	28
Notices for Adjustments of Hives	29	46
Certificates Issued for Inter-State Trade in Honey	37	70

Statistics in the Apicultural Services—continued.

	1953-54.	1954-55.
Quantity of Honey Exported to Queensland	403,580 lb.	656,280 lb.
Beekeepers Registered, 31st March	3,897	4,002
Protected Apiaries Registered	84	74
Apiary registration fees collected ..	£2,360 1s. 7d.	£2,712 13s. 10d.

Poultry Section.

A livestock officer (poultry) was transferred from head office to Parramatta, with territory including the Hills district and so far as Wyong. This area is one of this State's major poultry farming territories.

Poultry Breeding Improvement Plan.—The Poultry Advisory Board completed a Breeding Improvement Plan which was approved by the Minister and is now in the early stages of operation. Poultry farmers who join the plan must also be listed in the Pullorum Tested Flock Scheme.

The Poultry Improvement Plan (Eggs) is the first attempt in N.S.W. to give accreditation to producers who wish to breed for higher production. The Plan will be implemented by district livestock officers (poultry).

Random Sample Testing.—The second Random Sample Test, conducted at Hawkesbury Agricultural College, terminated on 31st March, 1955. It yielded useful information on productive capacity, causes of mortality, food consumption, and costs of commercial egg production.

The results are comparable with those of other countries and indicate that average, egg production could be materially increased provided producers practice better methods of husbandry and disease control. Several commercial poultry farmers have adopted the type of house designed to accommodate the birds competing in the Random Sample Test at Hawkesbury College.

Egg Laying Competitions.—For the past two years, birds in the Egg Laying Competition at Hawkesbury College have been housed in laying cages. This year another division of the competition comprised twenty-four teams, each of six birds, housed intensively on built up litter. Farmers prefer the latter, and the results of the two divisions will help to determine the relative merits of the methods of housing layers.

Poultry Efficiency Conference.—The principal livestock officer (poultry) attended the conference of Commonwealth and State Poultry Officers held at Perth in November, 1954, on means of promoting greater efficiency in the poultry industry. A report of the conference was submitted to the Australian Agricultural Council.

Poultry officers of the Department assisted officers of the Commonwealth Bureau of Agricultural Economics in an economic survey of a sample of commercial egg producers.

Chick Sexing.—Two officers are acquiring practice in chick sexing by the cloacal and optical methods. Although at present there are sufficient sexers in private practice to cope with the demand, the fact is that instruction in chick sexing has not been provided for some years. It is expected that livestock officers should, by acquiring proficiency in sexing in Departmental flocks, be equipped to impart instruction when necessary.

Extension Services.—Most of the Departmental publications concerned with poultry farming were brought up to date, and articles were regularly contributed as *Poultry Notes* and the *Agricultural Gazette of N.S.W.* In separate booklets sufficient manuscript for a projected text-book on Poultry Farming has been progressively published in the past two years. It is planned to collate them in a text-book in the near future.

The field and allied services of the Poultry Section are indicated to some extent by statistics:—

	1953-54	1954-55
Visits to private farms	743	938
Poultry culled from private farms ..	31,450	213,500
Breeding stock selected for private farms	5,100	7,500
Visits to other Government Institutions' Flocks	5	21
Lectures	22	30
Field days attended	8	16
Judgings at Shows	10	8

Statistics in Field and Allied Services—continued.

	1953-54.	1954-55.
Visits to Departmental Farms	20	25
Poultry schools for farmers, at Hawkesbury and Wagga Agricultural Colleges	3	2

Agricultural Extension Grant Demonstrations.—Three demonstration projects have been approved by the Commonwealth, for Agricultural Extension Grant expenditures, and each is arranged to proceed in the Tamworth-Kootingal area.

- Housing Layers in Cages*—to demonstrate the high, food utilisation efficiency and lower cost of producing eggs in a comfortable environment, with immunity from parasitic infestation.
- Intensive Housing, in small flock units*—to demonstrate the housing system used for random sample testing, which has shown the value of keeping birds in small flocks without great increase in management work.
- Free Choice Feeding*—a method allowing the layers to balance their own ration, through a high protein mash supplement to wheat. This method of feeding is especially suitable for wheat growing districts.

Piggery Section.

The staff position was partly relieved by the graduation and appointment of a cadet livestock officer (pigs) in January, 1955; the first to be appointed under the cadet scheme. Three more cadets are in training at Hawkesbury Agricultural College.

Industry Trends.—Virtual cessation of export marketing of pig-meats led to the local market being heavily over-supplied. Prices fell steeply, feed costs remained high, and many pig producers suffered heavy financial loss which forced a dispersal or substantial reduction of their herds. There is now some evidence of a developing shortage of pigs and prices may rise again as competition for supplies intensifies.

Departmental Pig Studs.—The depression in the industry caused a severe slump in the demand by farmers for stud pigs. This was reflected in the statistics of Departmental herds:—

	1952-53.	1953-54.	1954-55.
Stud pigs sold	469	410	184
Market pigs sold	408	277	528
Pigs killed for food	326	350	367
Approximate value	£17,000	£18,000	£13,000

Show Teams.—Teams from Departmental Studs were exhibited at Sydney Royal and some country Agricultural Shows with success. Awards were also won in bacon-pig competitions.

More Emphasis on Research.—Following a change in policy whereby greater emphasis will be placed on research into pig-raising problems, steps have been taken to disperse the herds at Yanco, Temora and New England Experiment Farms. The herds at Wollongbar and Grafton Experiment Farms will now operate as major research units whilst those at Hawkesbury and Wagga Agricultural Colleges will continue as stud herds. A limited amount of research will also be carried out at the two Colleges.

Swine Branding Act.—An important step was the promulgation of the Swine Branding Act on 1st February, 1955. It is hoped that implementation of the Act will lead to a reduction in losses from disease.

Extension and Regulatory Services—Pig Industry.—The pig industry recession did not slacken the demand for technical advice except in the south-western districts. The services of livestock officers (pigs) were called for on much the same scale as in previous years, as shown:—

	1952-3.	1953-4.	1954-5.
Farms visited	1,190	1,197	1,152
Meetings attended	87	74	76
Pig sales attended	73	80	68
Field days attended	39	33	32
Bacon factories visited	53	39	49
Experiment farms visited . . .	87	95	93
Shows attended	24	30	25
Lectures and demonstrations given	81	74	64
Stock Foods Act Inspections . .	39	5	12
Broadcasts	18	17	39

In addition to the work outlined in that tabulation a substantial volume of enquiries in person, by correspondence and by telephone were handled.

A school for pig-raisers was held at Hawkesbury Agricultural College in the winter vacation. It was attended by farmers from most of the pig-raising areas.

As in previous years technical assistance was given to the piggeries of the Departments of Prisons, Health, Education and Child Welfare. Agricultural Show Societies, the Agricultural Bureau and other farmer organisations, the Junior Farmer Clubs Movement, Pig Clubs, and the Australian Pig Society, were assisted by lectures, demonstrations and advice at every opportunity.

The need to reduce production costs became more pressing than ever in view of the fall in market prices for pigs whilst feed costs remained high. Accordingly, livestock officers concentrated their extension efforts on improving methods of breeding, feeding, housing and general management.

Attention was also paid to marketing, and the Australian Pig Society was supported in its efforts to establish the marketing of bacon pigs on a weight-and-grade basis. To that end £500 was obtained from the Commonwealth's Agricultural Extension Grant. In the far north coast area local bacon factories were encouraged to improve their marketing methods, with marked success.

Sheep and Wool Section.

The staff establishment increased to twenty-four. The new Coonabarabran district officer position was filled in October, 1954. Two district positions have been vacant since January, 1955; Deniliquin and West Wyalong. By drawing upon trained junior staff the vacant districts would be filled by the end of 1955.

This year, there were two resignations and one accidental death.

Industry Trends.—Wool prices, although very remunerative, declined from the levels of the previous year. The greatest declines were in the free fine wools and spinners and super spinners. The relative price increase for the medium and coarse crossbred type of wool was a feature of the sales.

There was not a marked swing towards Merino wool production at the expense of lamb raising or dual purpose breeding. The shortage of ewes suitable for fat lamb raising is as acute as ever and a major factor limiting the quantity and quality of lambs produced.

Lack of popularity of the Corriedale continued, and is causing concern amongst Corriedale breeders. However, they have taken stock of the position and are aiming to produce a type of sheep likely to be in more popular demand than the present Corriedale types.

The acute shortage of rams of British breeds suitable for fat lamb production continued to be a major limiting factor in quality lamb production. Younger stud breeders in particular are being encouraged to expand in such breeds.

In view of the continued shortage of British breed rams, it is highly probable that half-bred rams will be used as sires. That development would be to the detriment of the lamb industry.

A survey has indicated that scourable L.B.E. type branding fluids are being used much more than formerly. With the commercial production of the improved Si-ro-mark formulation, 100 per cent. usage of scourable branding fluids should soon be attained.

Coastal Sheep Industry.—A survey of sheep raising on the coastal strip was completed. The evidence suggests that the potential for economic production on the central and north coast is very limited but on the south coast, in the Bega Pastures Protection District, considerable expansion is possible.

Extension Work.—The work of the district livestock officers (sheep and wool) is summarised:—

	1953-54.	1954-55.
No. of properties visited	1,864	1,819
Sheep classed	381,688	354,307
Rams and ewes selected for breeders	7,622	4,062
Value of rams and ewes selected for breeders	£69,128	£56,503
Sheep selected for War Service Land Settlers	3,768	8,707
Value of sheep selected for War Service Land Settlers	£15,829	£24,078
Visits to War Service Land Settlers	198	193
Lectures, Demonstrations, Field Days	169	155
Agricultural Shows, Ram Sales, attended	90	82



Striking results in terms of *early* fat lambs from irrigated pastures have been yielded by the experimental project located at Leeton Experiment Farm.

The lambs were ready for marketing at 30th June.

(Photo from Leeton Office.)

Since there was one less effective district in operation throughout 1954-55 and there was considerable disorganisation because of the excessive rains and flooding, the volume of field work performed was relatively greater than in the previous year. The extension work amongst War Service Land Settlers is appreciated and increasing.

A notable feature of the extension activities of the sheep and wool officers is the increasing use of the press and radio to disseminate information.

Competitions.—The Merino Ewe Competition conducted by this Department in conjunction with the "Farmer and Settler" Newspaper has been continued, with record entries. The incorporation of a section for sheep husbandry has created additional interest.

The Fat Lamb Breeders' Ewe Competition conducted by this Department in conjunction with the Rural Bank of New South Wales has been expanded to include two aspects of the fat-lamb raising industry. One caters for the producers of fat-lambs and the other section caters for breeders of ewes suitable for fat-lamb production. Record entries were received. Judging is proceeding at the time of this Report.

Fat Lamb Carcase Competitions were conducted in collaboration with Goulburn and Wagga Abattoirs. In spite of adverse seasonal conditions, very satisfactory entries were received. Effective field days were held in association with the judgments.

Publications.—Departmental publications have been prepared dealing with sheep-raising activities in each district served by a livestock officer (sheep and wool). A series of publications dealing with the breeds of sheep in use in New South Wales is in preparation. An article on the effects of nutrition on breeding performance in the New England environment has been prepared.

PROJECTS AT EXPERIMENT FARMS AND STATIONS—SHEEP INDUSTRY.

Leeton Experiment Farm.—The fat-lamb projects have been expanded considerably, and now include:—

- (i) early fat-lamb production.
- (ii) economic return from breeding from young ewes, compared to the standard practice,
- (iii) double lambing,
- (iv) influence of nutrition on breeding performance,
- (v) spring lamb production.

Early lambs were marketed from Leeton Experiment Farm on 1st July, 1954; so far the earliest date at which experiment lambs have been ready for market. Results of completed trials are being prepared for publication.

Yanco Experiment Farm.—The results of the five-year lamb-raising trial are ready for publication.

Condoblin Experiment Farm.—The breeding of Dorset Horn Merino cross ewes for use in Departmental lamb-raising trials will be discontinued and replaced by a long-term project for the fixation of the Border Leicester Merino cross.

Supplementary feeding and drought feeding trials have not yet commenced, but are to commence during the coming year.

New England Experiment Farm.—The relative economy of dual-purpose breeding in comparison with lamb raising, under northern tablelands conditions, is under investigation.

Temora Experiment Farm.—The long-range programme of breeding Hornless Dorsets is proceeding.

Corriedale and Polwarth sheep production are being compared. This is a pilot trial. A full-scale commercial trial will be inaugurated when sufficient of each breed have been bred under the same environment.

Trangie Agricultural Experiment Station.—All sheep on this Station are used in breeding trials and research into Merino production, in particular inherited characters.

Shannon Vale Nutrition Station.—The research is concerned with nutrition of sheep for wool production and breeding performance, and the effect of improved nutrition on growth and reproduction of sheep.

A limited amount of fat-lamb production under improved pasture conditions has been undertaken.

The performance of Cheviot Romney cross is being compared to that of pure Romneys in the New England environment.

Cowra Experiment Farm.—Commercial fat-lamb production is the line of work at this farm.

DIVISION OF DAIRYING.

The normal work of the Division is comprised of administration of Acts and Regulations, herd production improvement activities, and research and extension services affecting efficiency in the dairying industry.

In spite of flooded and boggy conditions on the lower reaches of the coastal rivers and streams, production of milk increased substantially compared to the previous year. This was primarily due to the excellent pastures on higher grounds.

Milk from districts outside the Milk Board areas was again brought in under contract, to supplement internal supplies and prevent milk rationing.

The fall in the overseas market for cheese and powdered milk products and the comparative stability of butter caused a pronounced swing to butter manufacture. Approximately 88,100,000 lb. of butter was manufactured, compared to 66,500,000 lb. in 1953-54.

The downward trend reported last year in quality of milk and manufactured products, particularly butter, led to a concerted drive by dairy officers to improve the position by check grading at factories, by farm instruction, press statements, radio talks and general extension.

Flood Relief.—This accounted for much of the dairy officers' time which would have been spent on other phases. Some 866 claims were investigated by them, on behalf of the New South Wales State Flood Relief Committee of which the Chief of the Division was a member.

Regulatory Services.

DAIRY INDUSTRY ACT, 1915-51.

Advisory Committee.—The Dairy Produce Factories Advisory Committee met to consider one variation of the purposes for which a dairy produce factory could be used and was required on another occasion to consider an application for registration of new premises. The registration was approved. There were at 30th June, 1955, 110 dairy produce factories and 73 dairy produce stores registered.

Appeal Board.—The Appeal Board, constituted under Section 24 to deal with appeals against decisions of Inspectors under the Act, did not have occasion to meet.

Dairy Produce Factories and Stores.—Factory plant and machinery have been kept at a satisfactory standard by co-operation between factory managers, directors, and Departmental dairy officers. It was found necessary to issue seven remedial orders. Plans and specifications of six dairy produce factories and/or stores were submitted for specialist officers' approval of proposed alterations and/or additions. Several registered dairy produce factories expanded to include pasteurisation and/or bottling of milk by modern equipment. Twenty-two factories now supply such milk to country centres.

Certificates of Competency for Dairy Factory Operatives.—Five Dairy Science Schools were held, with a total attendance of 70. Certificates of competency were awarded to candidates on results obtained at these schools, at examinations of dairy factory operatives elsewhere and to holders of the Hawkesbury Diploma in Dairying. The details of certificates awarded were:—

	Examination of Dairy Factory Operatives.	Dairy Science Schools.	Holders of the H.D.D.
Cheese Making	2	—	9
Milk Grading	25	—	3
Butter Making	2	—	9
Cream Grading	—	11	—
Milk Testing	—	15	—
Cream Testing	—	21	—

Because of staff shortage the examination of many applicants has been deferred until 1955-56.

Butter Grading.—The butter grading staff of the Department, although depleted, made regular and continued examinations of New South Wales manufactured butter and cheese received by Sydney and Newcastle agents for distribution on the local market. At the peak of the season an experienced butter grader was made available for three months by the Department of Commerce and Agriculture to assist in this vital work. Two officers located in the Far North Coast Agricultural Region, trained graders of considerable experience, examined locally manufactured butter prior to it being held in cold stores in the Region.



Strip Grazing Controlled by Electric Fence.

The Department's experience with dairy demonstration farms has led to a standardised recommendation for electric fencing gear.

(Photo from Moss Vale Office.)

The information gained by graders was supplied to factory managers and district dairy officers to guide them in overcoming quality faults or other difficulties noted at the grading examination. Some 3,928 advice notes of that nature were issued to factory managers and district dairy officers.

Considerable quantities of interstate butter were also examined, at the request of selling agents handling the distribution in New South Wales.

The number of boxes of butter from inter- and intra-State sources examined by the State graders totalled 1,430,504, compared to 1,411,765 during 1953-54.

Because of staff shortage it was not possible regularly to carry out butter analyses for moisture and salt content. The average content of samples analysed was 15.4 per cent. and 1.36 per cent. respectively.

Officers of the Division served as judges and stewards in the Dairy Produce Section of the Sydney Royal Show and the North Coast A. and H. Society Show, Lismore, and in the competition held on the occasion of the Annual Conference of the Dairy Factory Managers' and Secretaries' Institute (New South Wales Division).

Choicest Butter Percentage.—The percentage of choicest butter manufactured from cream was 78.8 per cent., based on conditions set out in terms of the Order of Merit published each year for the information of factory managers. The comparative figures for the previous four years were 91.5 per cent. in 1950-51, 91.9 per cent. in 1951-52, 93 per cent. in 1952-53, and 83.3 per cent. in 1953-54.

Order of Merit Certificates.—Certificates of Merit of the Department of Agriculture are awarded to butter factories which, in a given twelve months' period, submit for grading a prescribed percentage of their total "choicest" brand production and of which 92 per cent. is found in the grading examination to be true to brand description. Such Certificates were gained by three factories in 1954-55.

The comparative figures for the preceding four years were seven in 1950-51, five in 1951-52, five in 1952-53, nil in 1953-54.

Milk and Cream Quality.—Officers made 200 visits to dairy produce factories to check grade the respective factory's milk and 500 visits to check grade the cream quality.

Margarine.—Permits were issued for the export of 7,192 tons of cooking margarine to other States. The quantity of table margarine exported to other States is obscure. Some firms have not furnished particulars, pending a Privy Council decision on the validity of the Act.

DAIRIES SUPERVISION ACT, 1901-1930.

Many new dairy premises have been constructed and older type premises modified to the requirements of the Dairies Supervision Act under the supervision of dairy officers. Officers inspected 3,200 dairies and it was found necessary to issue 303 remedial orders.

Eighteen registered milk vendors are bottling raw milk for distribution and twenty are pasteurising and bottling milk for distribution to centres outside the jurisdiction of the Milk Board Distributing Area.

Officers visited 3,700 farms to trace the cause of defects in milk and cream quality and to give advice on measures to prevent recurrence of the defects. No prosecution was launched under the Dairies Supervision Act.

PURE FOOD ACT.

One prosecution was launched for breaches of the Pure Food Act. This resulted in a fine, plus costs against the defendant.

FACTORIES AND SHOPS ACT.

Dairy officers carried out inspections on behalf of the Department of Labour and Industry, in respect of provision of amenities and the protection of employees from dangerous machinery in dairy produce factories.

Herd Production Improvement Scheme.

Herd Recording.—During the year seventy sub-units operated, with 58,216 cows recorded under the Group Section and 4,600 cows recorded under the Official Section; a grand total of 62,816 cows. An approach has been made for means to increase the establishment from 75 to 90 units, to cover anticipated expansion in 1955-56. It is thought that this approaches saturation point.

Five relief herd recorders have been appointed. This has reduced the difficulties that arise from resignations, illness, recreation leave, etc. There is still a need, however, for the appointment of a "senior organiser".

A contract has been signed for the installation of Punch Card Equipment for Group Herd Recording data. This will provide more efficient service for the farmer and much more satisfying use of the available statistical and investigational records.

Calf Marking Scheme.—Interest has been maintained in this Scheme. It was devised as a means of providing positive identification for female replacement stock. During the year 5,810 calves were marked, an increase of some 1,500 on the 1953-54 figures. The total of calves so far marked is now 37,074, in 1,128 herds.

A further 353 calves from artificial insemination were marked, compared to 76 in the previous year.

Certified Bull Scheme.—To date, applications for certificates have been received in respect of 530 bulls, and 363 certificates indicating eligibility of calves of those sires to be marked as Merit Calves have been issued.

Sire Survey.—The extraction of progeny records has continued. A publication covering results to November, 1954, has been received from the Printer.

Herd Wastage.—Data collected over the last four years have been collated with the use of Punch Card equipment on a custom basis. The results are expected to be published during 1955.

The one Herd Wastage Survey Officer employed is now confined to the area served by the Berry Artificial Stockbreeding Station.

Artificial Stock Breeding.—Some 6,913 first inseminations were recorded at the Berry Artificial Stock Breeding Station. For the three months ended 28th August, 1954, the conception rate on first inseminations was 68.6 per cent. and on second inseminations was 24.5 per cent.

The Division was responsible for selection of sires for use at the Berry Artificial Stock Breeding Station and has continued to co-operate with the Hunter Valley Dairy Company in selecting bulls for use at the Aberdeen Artificial Stock Breeding Station.

The Friesian bull, "Mooseheart Creator Ormsby", was imported from America for use at the Berry Station. This is a replacement for "Mooseheart Prince" which unfortunately died after leaving only two progeny. "Mooseheart Creator Ormsby" is a son of "Mooseheart Prince". It is anticipated that his use will prove popular.

The Australian Illawarra Shorthorn bulls group at the Berry Station is being strengthened by the purchase of several young bulls. It is also anticipated that the Department's Overseas Stock Buying Delegation will purchase animals of the Friesian and Ayrshire breeds for use at the Station.

Arrangements were made for the importation of a batch of Friesian semen under deep freeze conditions. As far as is known this is the first such shipment to New South Wales. The semen arrived in apparently good condition. It will be used over cows at Hawkesbury Agricultural College. This project may have a profound effect on the future of cattle breeding and artificial insemination work in this State.

Dairy Bull Loan Scheme.—This scheme continued to function. However, very few bulls have been loaned during the year because it is desirable at this stage to complete the proving of bulls already on loan. Steps have been taken to dispose of animals that have proved unsuitable.

Control of Government Herds.

Government Dairy Studs continued to receive considerable attention. Cattle exhibited at the Sydney Royal Show performed satisfactorily. It is felt that the Departmental Studs are serving a most useful purpose as a reserve source of bulls for use at the Berry Artificial Stock Breeding Station.

SIRE SURVEY—PROGENY IN DEPARTMENTAL HERDS, 1954-55.

Sire.	Number of Daughters.	Age.	Actual Average Production.			lb. Fat Difference* from Expectancy.
			Milk.	Fat.	Fat.	
<i>Jersey—</i>			lb.	per cent.	lb.	
Golden Conqueror (Imp.)	30	2	5,279	5.1	268	+ 11
	19	3	6,446	5.0	323	+ 33
	15	4-9	6,132	5.1	314	(337)
Bellavista Samaritan Royal (imp.)	15	2	4,340	5.4	234	+ 5
	15	3	4,648	5.4	253	+ 5
	11	4-9	4,550	5.2	237	(288)
Brampton Record's Pinnacle (imp.)	12	2	5,245	5.4	281	+ 19
	12	3	5,579	5.7	316	+ 20
	7	4-9	7,088	5.2	370	(344)
Yanco Snowman (S. Yanco Gay Boy)	5	2	5,814	5.6	328	+ 46
	5	3	4,981	4.9	245	- 76
						(380)
<i>Ayrshire—</i>						
Carnell Perfect Pilot (imp.)	21	2	6,807	4.2	288	+ 14 Breed av.
	12	3	8,322	4.2	347	+ 61 "
	11	4-9	8,682	4.2	363	+ 35 "
Bathurst Carnation's Pilot (S. Carnell Perfect Pilot)	5	2	6,598	4.2	277	+ 3 "
<i>Guernsey—</i>						
Bella Cora's Royal Star of Les Jetteries (imp.)	21	2	5,014	5.1	258	- 7
	20	3	5,363	5.0	266	- 21
	8	4-9	5,189	4.8	248	(667)
Wollongbar Undine's Star (S. Bella Cora's Royal Star of Les Jetteries (imp.)	9	2	4,202	5.3	222	- 43
	6	3	5,261	4.5	235	- 52
						(337)
Wollongbar Jeanette's Laddie (S. May Rose's Laddie 3rd. of the Masse (imp.)	21	2	5,772	5.1	292	+ 27
	13	3	6,109	5.1	314	+ 27
	15	4-9	6,590	5.1	334	(337)
Wollongbar Joshua (S. Wollongbar Jeanette's Laddie)...	7	2	5,456	4.6	252	- 13
	5	3	6,777	4.6	310	+ 23
						(337)
Wollongbar Chrysalis Flares (S. Flares 2nd of the Bouillon (imp.)	6	2	5,220	4.8	248	- 17
						(337)

SIRE SURVEY—PROGENY IN DEPARTMENTAL HERDS, 1954—continued.

Sire.	Number of Daughters.	Age.	Actual Average Production.			lb. Fat Difference* from Expectancy.
			Milk.	Fat.	Fat.	
<i>Friesian—</i>						
Parkhouse Akrinjo 2nd (imp.)	10	2	lb. 7,831	per cent 3.6	lb. 281	+ 7
	7	3	8,710	3.7	319	+ 10 (389)
<i>A.I.S.—</i>						
Grafton Mosaic (S. Alfa Vale Monition)	12	2	7,628	4.0	308	+ 52
	10	3	8,654	4.0	354	+ 40
	6	4-9	8,989	4.0	356	(329)
Grafton Molly's Campus	5	2	7,148	4.0	287	+ 30 (329)
Tabbagong Camera (S. Tabbagong Excelsior).....	6	2	7,113	4.0	282	+ 25 (329)

* Expectancy figures based on herd averages for 1953-54, as 1954-55 figures are not available at 30th June, 1955.

Publicity for Herd Improvement Matters.—Publicity was continued through the press and the bi-monthly booklet *Herd Recorders' Letter*, which is now a well-established part of the Herd Improvement Scheme. Bulletins covering herd improvement have been revised. Details of progeny recorded bulls and register of merit cows have been prepared for publication.

Extension Services.

Production Improvement Project.—Of the 264 participating farmers reported last year, 150 have withdrawn from this scheme. The scheme has received less attention from dairy officers than in previous years, partly because of increased demand on their time for instructional work in relation to quality.

Development of Dairying in Deniliquin Dairying District.—The development of Wakool and Berriquin Irrigation Areas has resulted in dairying becoming a more economic proposition

in that part of the State. The expansion is illustrated by the fact that fifty-six new dairies have been established there in the past three years. Butter production in the Areas is reported to be an all-time record. The 520 tons at Finley factory represents an increase of 100 tons over the previous year. Koondrook factory, situated just over the border from Barham, manufactured 250 tons. This factory draws 60 per cent. of its supply from the Deniliquin District.

The Lawson syphon, opened in April, 1955, will supply water to the Deniboota Irrigation District with an area of over 300,000 acres. The following figures illustrate the average production of milk and butter fat in the two herd-recording units operating in this district:—

- 1951-52—5,846 lb. milk, 254 lb. fat.
- 1952-53—5,775 lb. milk, 274 lb. fat.
- 1953-54—5,971 lb. milk, 286 lb. fat.



Berriquin Dairying.

The capacity of Murray River districts to increase the State's dairy production is increasingly apparent. In the Wakool and Berriquin Irrigation Areas 56 new dairy farms have been established in the past three years.

(Photo from Deniliquin Office.)

General Extension.—Officers made 2,860 visits to farms for the purpose of general extension service.

Country Agricultural Societies' Shows.—Dairy Division officers attended fifty-two country Shows, to assist in the judging of dairy products and to act as stewards or judges in dairy cattle sections.

Special Schools.—In addition to five Dairy Science Schools, attended by seventy students, a Dairy Farmers' School was also held at the Hawkesbury Agricultural College. This was attended by twenty-five farmers.

War Service Land Settlement.—Officers of this Division continued to undertake inspection of estates proposed for allotment to ex-Servicemen, and to give special advisory attention to soldier settlers.

Dairy Industry Extension Grant.

From the Commonwealth £64,879 was made available, together with £12,002 from the previous financial year, for Dairy Industry Extension Grant work in New South Wales. These funds were for expenditure under the following headings:—

- Grade Herd Recording.
- Farm Demonstrations.
- Salaries and Expenses of Organising Officers.
- Salaries of other Officers concerned in Dairy Industry Extension Grant Work.
- General Publicity and Extension Work.
- Sire Surveys.
- Wastage Surveys.
- Artificial Stockbreeding Station, Berry.
- Purchase of Bulls for Berry.

Dairy Grant Demonstrations.—One hundred and seven new demonstrations were approved. In addition, damage by flood and near flood conditions in the Hunter Valley and the Far North Coast Region made it necessary to carry over a number of the 1954 demonstrations, and six demonstrations in the Bega district were carried over because of drought.

Unfortunately it was impossible to sow several of the demonstrations approved for this year in the Far North Coast Region. The seed and superphosphate will be stored and the demonstration areas will be sown early in 1956, weather permitting.

Reports from all dairying districts indicate that results from the demonstrations established in 1954 have far exceeded expectations. Moreover, the actual progress in methods and the production increase effected on individual demonstration farms are overshadowed by the influence of the demonstrations on district farming practices.

When the present series of demonstrations was inaugurated one of the conditions imposed was that the respective farmer in the second year of the demonstration would be required to sow an acreage equivalent to the area sown in the preceding year as a demonstration. The majority have complied, and many of them have sown in excess of the stipulated area. Where the agreed upon increase has not been sown, the explanation was readily apparent, as a rule, in flood or near flood conditions.

Impressive results were again obtained in the Illawarra district and demonstration work in this area has in particular brought about improved techniques in sowing and in the application of lime and fertiliser to suit local conditions. The how and when of such applications is proving just as important as the use of proper pasture mixtures.

Strip Grazing Equipment.—In almost every case of a new demonstration an electric fencing unit has been supplied for the farmer's use. It is a recoverable item. Experience in strip grazing on demonstration farms has resulted in the following standard equipment being recommended—battery unit in carrying case, one reel with 1,000 yards soft 14-gauge wire, 12 posts, ram's horn type, 2 corner or straining posts.

Extension Publications.—One editorial assistant in the Division of Information and Extension Services is an employee under the Dairy Industry Extension Grant. Dairy industry publications under editing attention included *The Herd Recorders' Letter* (bi-monthly)—three issues printed, "Recording Pure Bred Registered Cattle, No. 19", "Raising Dairy Calves" (revised edition), "Scours in Calves", "Milk Grading—Theory and Practice", "Milking Machine Efficiency, Field Manual", and "Cheese Mite Control".

Feature articles prepared for *The Herd Recorders' Letter* included:—"Elevated Bails" (2nd and 3rd articles in a series of three) "£80,000 Cow Bail Revolutionises Milking", "Electricity—An Aid to Economic Production", "Group Herd Recording—1953-54", "Winter Rations for Milking Cows", "Rust Can Spoil Your Milk", "Strip Grazing—What Area Will Your Cow Need?", and "Electricity, Most Complete Answer to the Problem of Farm Water Supply."

Twenty-one success stories were compiled, from reports of Dairy Industry Extension Grant projects on file, for publication in *The Herd Recorders' Letter*. Several of these stories were published also in the weekly *Press Copy* to newspapers and radio stations and three of them in *The Agricultural Gazette of N.S.W.*

Extension Display.—One display artist/designer in the Division of Information and Extension Services is an employee under the Dairy Industry Extension Grant. Show exhibits promoted at Wagga, Byron Bay, Bombala, Bathurst, Orange, Bega and Clarendon by country officers were assisted by the display artist/designer.

The design and/or finished art work was done for lecture aids concerned with good and poor fencing, electric fence strip grazing, foot and mouth disease, and various other topics. Design and art work was done for 16-mm. ciné film frames in the films "Schools for Farmers", "Establishing Irrigated Pastures" and "Herd Improvement".

Illustrations, page headings, and photograph retouchings were executed for many of the dairy industry publications to enhance their effectiveness as extension media.

Miscellaneous services by the display artist included field day signs, ticket and sign-writing jobs, and the servicing and crating of display aids such as propomats and automatic slide projectors, loaned to field officers for country displays.

Photographic and Radio Aids.—Tape-recorders are now located at field offices in radio station towns; four of them were acquired from Dairy Industry Extension Grant funds. They are facilitating the acquisition of field recordings, farmer interviews and actualities, for use in field officers' local broadcasts.

The photographic aids section of the Division of Information and Extension Services reports an increasing standard of technique and extension usefulness in field officers' 35-mm. photography. In all, 4,720 colour slides and 8,130 black and white slides, from field officers' camera efforts, were examined and returned to field officers with tutorial comments, and a high percentage of these transparencies affected dairy industry extension service.

Amongst 2,765 black and white prints supplied to subject-matter specialists and to editorial officers were some 900 to the Principal Dairy Officer (Herd Improvement) for dairy livestock records.

Miscellaneous.

Interstate Visits.—The Chief of the Division visited Brisbane and Melbourne in connection with Show judging and/or the purchase of stud stock.

A visit to Victoria, to the C.S.I.R.O. headquarters and Leongatha Cheese Factory, was made by two specialist officers to acquire first hand information on the new method of cheddar cheese manufacture developed by the C.S.I.R.O. in conjunction with the Victorian Department of Agriculture.

Overseas Stock Buying Delegation.—The Chief of Division is a member of the Department's Overseas Stock Buying Delegation, led by the Honourable Minister, which departed from Sydney in May, 1955, to purchase stock on behalf of the Department.

Dairy Officers' Conference.—A conference of officers in charge of Dairying District offices was held during May, 1955. In addition to general discussion on dairying matters, papers prepared by dairy officers were read and discussed.

DIVISION OF SCIENCE SERVICES.

Biological Branch.

PLANT PATHOLOGY SECTION.

NEW PLANT DISEASES.

Seventy-three new plant diseases were recorded in New South Wales. The majority were of little importance and had probably been present for some time. The more important included grey mould neck rot (*Botrytis allii*) of onion,

Fusarium wilt (*Fusarium oxysporum*) of rockmelon, yellow slime (*Xanthomonas hyacinthae*) of hyacinth, ray blight (*Ascochyta chrysanthemi*) of chrysanthemum, rust (*Uromyces striatus*) of burr medic, parsnip canker (*Intersonilia* sp.) and bacterial blight (*Pseudomonas aptata*) of fodder beet. Those are all potentially serious.

The host range of root knot nematode (*Meloidogyne* spp.) in New South Wales was also widened by nine new records.

CEREAL DISEASES.

Wheat.—Mid-October rains improved the wheat crop prospects but excessive rain in some areas decreased potential yields and adversely affected grain quality. Diseases were fairly general but damage on the whole was slight. Stem rust (*Puccinia graminis tritici*), present in most areas, mainly developed too late to do much damage. The variety Festival showed good resistance to the races present in most districts. Flag smut (*Uromyces tritici*) was more prevalent than in the previous year in the Gunnedah area and was also recorded at Young and Parkes. The main variety affected was Gabo and it would seem that replacement of this susceptible variety is advisable if general damage done by flag smut is to be avoided. Bunt (*Tilletia caries* and *Tilletia foetida*) was less prevalent than in the previous year but some crops were affected in all areas. In the West Wyalong area several crops were severely affected. The occurrence of bunt appears to be due to the failure of some growers to adopt standard control measures and, in some cases, to faulty methods of seed dusting.

Oats.—As in previous years, leaf rust (*Puccinia coronata*) was one of the most serious diseases in fodder crops whilst the smut (*Ustilago avenae* and *Ustilago kollerii*) were heavy in some grain crops, especially in the Mudgee area.

Maize.—Leaf rust (*Puccinia sorghi*) and leaf blight (*Helminthosporium turcicum*) were prevalent in many crops. Examination of numerous cross-bred lines from Glen Innes showed that considerable variations in reaction to the rust races present existed in these lines and some appeared to be showing quite promising resistance. On some plants of these lines, two new diseases of minor importance were recorded. These were anthracnose (*Colletotrichum graminicola*) and leaf spot (*Cercospora* sp.). On the north coast, stalk rot was present following early autumn rains; and an unidentified distortion of young leaves and the growing point caused some damage.

Cow Cane.—Several crops of cow cane in the Kempsey district were severely damaged by three diseases during the summer. The main damage was caused by Fiji disease (virus) but ratoon stunting (virus) and pokkah boeng (*Fusarium moniliforme*) were also present. In some cases the damage was so severe that destruction of the stands was advised.

DISEASES OF OTHER FIELD CROPS.

Clovers and Medics.—Diseases were prevalent in these plants. Heavy incidence of rust (*Uromyces trifolii*) was reported on subterranean, red and white clovers, especially in the early summer and early autumn. Ring spot (*Stemphylium sarcinaeforme*) of red clover caused some damage in pastures at Glen Innes and Kyogle. Root knot (*Meloidogyne* spp.) was recorded for the first time on subterranean and red clovers but has probably been presented for some time. Several other diseases caused by viruses and nutrient deficiencies continue to cause severe reduction in pasture vigour in many areas and are under investigation.

Lucerne.—Lucerne rust (*Uromyces medicaginis*) was heavy in most areas, and leaf spot (*Pseudopeziza medicaginis*) was also prevalent. Following the early autumn rains, many coastal lucerne crops were flooded and crown and root rots (*Sclerotium rolfsii*, *Rhizoctonia solani*) caused severe damage.

Cowpea.—A stem rot of cowpea with which a species of *Phytophthora* was associated was prevalent in the Kyogle district during the wet autumn weather. Several acres were destroyed by the disease.

VEGETABLE CROPS DISEASES.

Bean Seed Certification Scheme.—In co-operation with the Division of Plant Industry, the Bean Seed Certification Scheme was continued for the twelfth successive season. Of the 385 acres submitted for certification, 329 acres were passed, with an estimated total yield of 3,695 bushels of certified seed. This was made up mainly of 2,800 bushels of Brown Beauty (78 per cent.). Hawkesbury Wonder, Tweed Wonder and Gowards Special made up the bulk of the remainder.

This season no crop was rejected on the presence of zero tolerance diseases, in spite of the very favourable weather for their development during February and March. The Vickery strain of Brown Beauty has been outstanding in freedom from anthracnose over the last three seasons, even when the disease was prevalent, as in 1952-53, in most other lines.

Bean Anthracnose (*Colletotrichum lindemuthianum*).—Whilst only one case of anthracnose was seen in bean crops on the south coast, conditions on the north coast produced one of the worst seasons for anthracnose. During late autumn and early summer, crops were severely damaged and this heavy field infection was reflected in the large number of consignments affected with the pod spot phase at the Sydney Municipal Markets. In the field Tweed Wonder showed good resistance, indicating that the main strain present was Strain 1. During the summer the incidence decreased but autumn consignments of beans received from the north coast again showed quite heavy anthracnose.

Anthracnose and rust are now the two most important bean diseases in New South Wales. Continued selection and testing has resulted in a line of Brown Beauty 100 per cent. resistant to Strain 1 of the anthracnose fungus, and work to produce lines resistant to both of the strains known to be present is continuing.

This year, in co-operation with the Division of Plant Industry, numerous cross-bred lines were tested for resistance to both strains of anthracnose and some lines with resistance to both strains were found. Testings for anthracnose and rust resistance on numerous lines produced by Professor W. L. Waterhouse are not yet complete. The anthracnose resistant selection from Hawkesbury Wonder has been carried on to the next generation and testing has shown that it is segregating for resistance. Further selections are being made.

In future most of the routine testing of crosses for anthracnose resistance will be carried out at Hawkesbury Agricultural College. Cultures of the fungus are being supplied and assistance given to the College in the early stages of this work.

Testing of seed of several introduced bean varieties indicates considerable differences between the strains of anthracnose in this country and those in the country from which the seed was obtained. Further comparisons of these strains, by noting varietal reactions, are proceeding.

Bean Rust (*Uromyces phaseoli typica*).—In the winter of 1954, the worst rust incidence for many years was seen in north coast bean crops. Later in the year, the severity of rust declined but was replaced by severe anthracnose. In other areas, rust was not so severe and was not prominent until well into the autumn of 1955. Several lines of beans grown at Hawkesbury Agricultural College were examined for rust infection and some promising lines noted. These will be carried on for further rust and anthracnose testing.

Potato Virus Diseases.—Crop surveys and certification inspections during the past season indicated that neither leaf roll nor mosaic is now a significant source of rejection of crops submitted for certification in tableland areas. This very favourable position, particularly in regard to leaf roll disease, has been achieved by the successful operation of the Potato Seed Certification Scheme initiated in 1932 and, in recent years, by this Department's continued release of new varieties of very low disease content. In the 1920's and 1930's leaf roll took a heavy toll of production. In the first years of certification, the variety Factor became the most widely grown but this variety proved very susceptible to leaf roll, and its gradual displacement by the newer varieties has contributed significantly to the decline in leaf roll incidence. In the 1947/48 season, rejections for excess leaf roll content represented 30 per cent. of the acreage submitted for certification on the northern tablelands, 18.7 per cent. on the central tablelands and 26 per cent. on the southern tablelands. In the past season, none of the acreage submitted on the northern or southern tablelands and only 3.6 per cent. on the central tablelands was rejected for excess leaf roll content, representing only 0.22 per cent. of the total tableland acreage submitted. The incidence of mosaic diseases, spotted wilt, and purple-top wilt, was also extremely low, resulting in negligible rejections.

Late Blight of Potato (*Phytophthora infestans*).—Tests previously reported have indicated that a number of lines of potatoes introduced from overseas were resistant to the commonly occurring strain of the late blight fungus. Tests are planned to determine the reaction of all seedlings bred by this Department to local isolates of the fungus. The objective is that all future varieties of potatoes released shall be resistant to this strain of late blight.

Fusarium Wilt of Tomatoes (*Fusarium oxysporum* f. *lycopersica*).—Further observations on the widely grown mid-season variety Grosse Lisse confirm that this plant has satisfactory commercial resistance to fusarium wilt in normal seasons. Co-operation continued in the Division of Plant Industry project to produce tomato varieties containing single dominant genes for resistance to fusarium wilt, and various isolates of pathogenic strains of *Fusarium oxysporum* f. *lycopersici* have been supplied for inoculation purposes. In glasshouse tests it has been shown that the American tomato variety Manalucie is highly resistant to all New South Wales isolates of the pathogen so far tested.

Virus Diseases of Tomatoes.—Until the virus reported last year to cause yellowing and size reduction in tomato leaves has been identified it is proposed to name the disease "Yellow Top". This virus has now been transferred to potato, *Datura stramonium* and *D. innoxia*. Commercial crops were again severely affected with this disease and there was no apparent control by any of the spray programmes practised by growers. Yellow top has been recorded in the field on all commonly grown varieties and has been transferred by graft to all varieties so far tested in the experimental glasshouse. As plants grown from seed harvested from affected fruit were healthy it has been concluded that the disease is not seed borne. "Drophead" wilt was again present in some tomato glasshouses in the Warriewood-Mona Vale district but has not been observed elsewhere. Investigations so far suggest that it may be closely related to the tobacco mosaic virus. All tomato varieties inoculated with the virus have developed severe and typical symptoms of the disease. Though several other species of solanaceous plants may be infected with the virus the necrotic breakdown of the internal tissue of roots, the cause of death of tomato plants, is absent.

Club Root (*Plasmodiophora brassicae*) of Cauliflower.—Club root is becoming more widespread in the cauliflower growing soils of the Sydney metropolitan area, particularly in the Richmond-Windsor section. This is the principal winter revenue crop for vegetable growers and the possibility of fungicidal control of club root has been reopened in an endeavour to find a practical means of control. Previous recommendations for the control of the disease in the field, involving treatment of individual transplanting sites, are not practical in commercial plantings.

An experiment has been undertaken on a property at Richmond to compare the control obtained by dipping seedling roots in a sludge of a 4 per cent. calomel in tale dust, prior to transplanting in the field, with incorporation of a 4 per cent. calomel in tale dust in the transplant sites and

with watering of transplant sites with mercuric chloride solution. Preliminary results indicate that the calomel-tale sludge method of treatment is worthy of further trial.

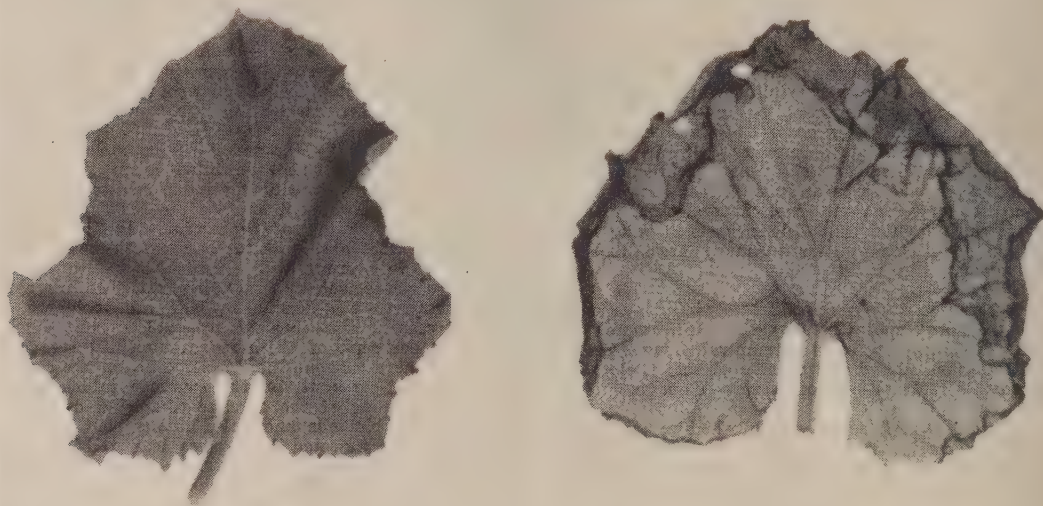
Molybdenum Deficiency of Rockmelons.—Previous reports have referred to the importance of the trace element molybdenum in the nutrition of vegetable crops, including rockmelons, in the coastal areas of New South Wales. This year it has been demonstrated that molybdenum deficiency is widespread in rockmelon crops in the Murrumbidgee Irrigation Areas, and outstanding results have followed the application of molybdenum compounds. The deficiency was demonstrated in crops growing on soils which varied from light sands to heavy clay loams and, more importantly, in crops on soils which ranged in reaction from very acid to alkaline. This indicated that in the M.I.A. there exists an actual soil deficiency of molybdenum rather than an unavailability of the element. The latter is found generally to be the case on the more highly acid coastal soils.

Molybdenum application was followed by a positive response in the form of increased, healthy, vine growth. The period of fruit setting was also markedly prolonged, previously a rare feature of rockmelons in the M.I.A. Further work on molybdenum deficiency diseases in this area is proposed. One object is to determine the most efficient yet effective method of applying molybdenum to large areas of rockmelons.

This work has advanced the control of molybdenum deficiency diseases in the field and is an extension of our knowledge of molybdenum deficient areas, using technique evolved originally by the Biological Branch.

Fusarium Wilt of Rockmelon.—An outbreak of a vascular wilt disease of rockmelon (*Cucumis melo*), caused by a strain *Fusarium oxysporum*, occurred in a market garden at Brookvale in the Sydney metropolitan area. It is the first record of this disease in New South Wales. The symptoms, wilting and ultimate death of the vine, closely resemble those of watermelon wilt which has been present in this State for many years and which is caused by a closely related strain of this pathogen. A fusarium wilt of rockmelon has been known overseas for many years.

In the Brookvale crop, infection had occurred in practically every rockmelon plant and most plants were dead when the crop was inspected in mid-February. Isolates of the fungus obtained from infected vines will be used in glasshouse tests to determine the reaction of a number of rockmelon varieties, including local commercial types and two



Molybdenum deficiency in rockmelons—interveinal, leaf yellowing and marginal scorching (right)—was shown to be widespread in the Murrumbidgee Irrigation Areas, and under such conditions as to indicate a true soil deficiency of molybdenum in the M.I.A.

This is an extension of knowledge of molybdenum deficient areas.

varieties bred in the United States for resistance to the strain of *Fusarium* causing wilt of rockmelons in that country.

Parsnip Canker (*Interzonilia* sp.).—During August, September and October of 1954, parsnips from several market gardens in various parts of the Sydney metropolitan area were affected by parsnip canker. The disease caused up to 70 per cent. loss in one planting. It has probably been present for some time though the causal fungus has not previously been recognised. Work on the identification of the fungus and on parsnip diseases in general will continue.

Diseases Caused by *Rhizoctonia* spp.—Work continued on diseases caused by *Rhizoctonia* spp., and several more isolates have been collected from various hosts. Preliminary inoculation tests indicate that definite differences exist between them. Studies on the control of these diseases with chemicals and by the use of soil amendments have commenced.

Broad Bean Vascular Wilt Disease.—The vascular wilt disease of broad bean, caused by a virus and described originally in Victoria, appears to be well established now in a number of host plants in the Sydney metropolitan area. Many specimens of affected broad bean plants have been submitted for examination and a number of commercial growers have suffered light to severe losses because of vascular wilt disease in this crop.

A disease affecting sweet pea crops in the metropolitan area has been found to be caused by this virus. Incidence of infection was very high in several localities. Gladioli, lilies and ranunculi have also been found to be susceptible.

Beet Eelworm.—There has been no additional record of beet eelworm disease (*Heterodera schachtii*) in New South Wales since the 1953 outbreak at Milperra in the Sydney metropolitan area. Careful cultural and rotational practices on the property satisfactorily confined the pathogen. No further work on this disease is at present contemplated.

Mushroom Culture and Diseases.—The quality of commercial pure culture grain spawn continued to be satisfactory. There are four commercial spawn producers at present operating. The incidence of mushroom diseases and weed fungi in outdoor ridge beds is insignificant where proper composting is carried out and where casing soil is sterilized. In one instance, where casing soil had not been sterilized, an outbreak of bubbles (*Mycogone perniciosa*) involved some 3,000 surface feet of ridge bed.

CITRUS DISEASES.

Sealybutt.—In collaboration with the Division of Horticulture, the planting of experimental trees at the newly established Citrus Research Station at Somersby was commenced in the spring. Further propagations of stunted and sealy butted trees have been made at Narara, to elucidate their relationships. To determine whether stunting is of virus nature, buds from affected trees were inserted on yearling Valencia on trifoliata of a superior type. These will be grown at Somersby and compared with uninoculated trees. A further selection of trifoliata strains has been budded, and seed collected. Buds of 3 nucellar lemons of good performance, and of Frost nucellar Eureka and Lisbon lemons imported from California and grown in quarantine, and buds from non sealy Lisbon lemons from Victoria, have been worked on to trifoliata stocks.

Tristeza—Stem Pitting and Yellow's Virus Complex.—It is now accepted in the U.S.A. that tristeza and stem pitting are manifestations of the one virus, and stem pitting symptoms on indicator seedlings have been regarded as evidence of the presence of tristeza in Florida and Texas. Work in N.S.W. over the last year, using as indicators seedlings of sweet orange grafted on bittersweet Seville roots, indicates that two separate viruses are involved. Twelve isolates of stem pitting virus, including very mild and very severe strains, have failed to induce tristeza symptoms in the test seedlings. Only when the "yellow's" virus was introduced were tristeza symptoms produced. It is now considered that "yellow's" is the seedling symptom of tristeza on Seville and other sensitive stocks; that these varieties have field immunity as a result of their hypersensitive reaction; that these varieties are injured only when orange or mandarin in which the tristeza virus multiplies freely are worked onto them; and that stem pitting is a distinct and unrelated virus.

In collaboration with the Division of Horticulture, experiments have been continued on the protective effect of mild strains of stem pitting. Yearly observations are being made on a block of young grapefruit at Barham to record variations

in fruit setting symptoms. It is considered that tristeza may have a debilitating effect on rough lemon stock over a period of years, and propagations have been made to test the protective value of an intermediate stem piece of a tristeza resistant variety.

Psorosis-type Diseases.—Several outbreaks of a gummosis condition at first thought to be Florida gummosis have been under investigation. The severity of the condition has now subsided and all trees are showing symptoms of psorosis A. In California it is now accepted that the severe psorosis B disease, which the N.S.W. outbreaks resembled, is the expression of shock symptoms of psorosis A when newly introduced into a healthy tree. It is therefore suspected that the N.S.W. outbreaks are the result of the spread of psorosis A by an insect vector. A catalogue of all psorosis-affected trees in N.S.W. is being compiled, with the object of their ultimate elimination. A second type of psorosis is under study. It agrees in many respects with Florida gummosis.

Lemon Crinkle Leaf.—No further cases of infection have been found. Seedling and strain reaction are under investigation.

Mandarin Brown Spot.—Continuously wet weather in summer and autumn favoured brown spot development in coastal orchards, and losses were heavy in parts of the Windsor district. A spray trial using Zineb, phenyl mercury chloride, mercury fixtan and Streptomycin was carried out at Ebenezer. Streptomycin sprays had no effect on disease development in shoots or fruit. Fixtan and Zineb showed promise. Phenyl mercury chloride caused some fruit injury, but showed evidence of eradicative action. Growers who have been applying an annual 3-spray Bordeaux programme over a 3 year period have had smaller losses than growers who have not sprayed. Work on the causal organism has continued.

Stunting of Sweet Orange on Rough Lemon Stock.—Inoculations were made by budding from infected trees to healthy yearlings, to determine whether the condition is bud transmissible. Work with seedling indicators has so far given confused results, but a relationship with the Palestine Xyloporosis disease appears possible.

Magnesium Deficiency.—In collaboration with the Division of Horticulture an investigation of the effect of foliar application of magnesium alone and combined with nitrogen has been commenced at Tocumwal. Different strengths of spray and times of application are also being compared.

Septoria Spot.—The now general use of an autumn Bordeaux spray by M.I.A. growers has reduced losses from *Septoria* to negligible proportions. Experiments are in progress to test Zineb and combined sprays of zinc, magnesium, manganese and molybdenum with Bordeaux mixture.

Soil Acidity.—There has been further evidence of the deleterious effect of very acid soil on trees on trifoliata stock. Under these conditions the roots absorb manganese in toxic quantities. The effect is yellowing of young growth and defoliation of older leaves, usually with development of tar spots.

Root Rot (*Phytophthora citrophthora*).—Exceptionally wet weather from January to June resulted in widespread waterlogging in many lowland orchards in the central coast, Windsor and Hills districts. This led to marked resurgence of root rot activity by *Phytophthora*, particularly on mature to old trees on rough lemon stock. Many mature trees which survived the wet years of 1949-52 will probably succumb in the coming season. The district fruit officer, No. 2 Fruit Area, estimated that approximately 4,000 acres of citrus trees in the central coast area are uneconomic due to root rot. Nearly 100 per cent. of trees planted in the Murrumbidgee Irrigation Areas and 80 per cent. of plantings in the Gosford and Windsor districts over the last few years have been on the resistant trifoliata stock.

Black Spot (*Guignardia citricarpa*).—In collaboration with I.C.I.A.N.Z. a comprehensive field experiment has been undertaken at Peat's Ridge to test a number of new fungicides against black spot of Valencias. Standard methods of control have been included for comparison.

Sudden Death.—Further cases of this disease occurred in orchards at Mangrove Mountain, Terrigal, Wamberal, Lisarow, Ourimbah and Dooralong. In one property at Terrigal 12 per cent. of the 450 x seven-year old tree planting have succumbed. Isolations from fresh material were attempted, using various techniques and media. Fungi isolated are not promising, but are being tested for pathogenicity.

Winter Yellows.—Incidence of so-called winter yellows has been much less evident in young citrus trees this year in the Gosford district, Murrumbidgee Irrigation Areas and Lower Murray districts, but is fairly widespread and severe in the Windsor area. Indications that tree nutrition is closely associated with this condition are being investigated. Most trees affected in previous years have completely recovered.

Potassium Deficiency.—A type of leaf yellowing is occurring frequently in the central coast area, particularly in lowland orchards on trees carrying heavy crops of fruit. This condition has responded to leaf injections and foliage spray applications of potassium salts. The incidence and methods of prevention are being investigated.

Citrus Wastage Investigations.—In co-operation with the C.S.I.R.O. Division of Horticulture and Food Preservation, investigational work continued on the control of wastage in stored lemons by means of field sprays and post harvest dips. The combination of Bordeaux Mixture sprays and 2, 4-D hormone dips is promising.

Citrus Nutrition.—Glasshouse investigations and pot studies have been continued on the general nutritional status of Somersby soils. Investigations with subterranean clover have revealed that potassium, calcium, magnesium, molybdenum, iron and boron are deficient. Although this soil responds to moderate phosphate supplements, applications of the order of 5 cwt. per acre markedly depress growth. In some of these soils manganese is available in toxic quantities, while in others there is considerable growth response to applications of this trace nutrient. The role of copper and zinc remain to be further investigated. Borax at 3.5 lb. per acre rates has given outstanding results not only with subterranean clover but also with red and white clovers.

DISEASES OF DECIDUOUS FRUITS.

Yields of stone fruit crops were generally good this season, although brown rot caused some substantial losses. Pome fruit yields were low, due to failure of highland apple crops. This failure followed record crops carried in the previous season and severe late frosts. Pear crops were good.

Black Spot of Apples (*Venturia inaequalis*).—Infection conditions during the spring were very favourable in all highland districts, and non-sprayed non-bearing trees became heavily infected. However, good commercial control was achieved by growers who followed the spraying schedule recommended by this Department.

Ascospore discharge studies were continued. The period of peak maturity of perithecia was again found, for the seventh successive year, to occur about "petal-fall". The general, satisfactory control of the disease this season despite favourable infection conditions is believed to reflect frequent spray applications now made around this period as a direct result of these investigations.

The use of new spraying equipment, such as high volume sprayers with "brooms" operated manually from a platform on the machine, and low volume, air blast, or concentrate automatic sprayers, has greatly speeded the spraying work and facilitated the implementation of the changed, spray timing recommendations.

Extensive use of sod culture in orchards has also helped, by allowing machinery to be operated immediately after rain periods.

The results of the ascospore discharge work suggest that the importance of the pre-bloom Bordeaux mixture sprays may have been over-emphasised in the past. As these sprays constitute a major production cost an experiment was carried out at Batlow to determine if they can be reduced in number and/or concentration without reducing the control of black spot. The results have not yet been analysed.

The organic fungicide thiram continued to be widely used, particularly on varieties with some resistance to powdery mildew. A long term, statistically designed experiment was initiated at the New England Experiment Farm to compare the yield of Granny Smith and Rome Beauty apples under spraying schedules of lime sulphur and of thiram.

In a grower's experiment at Orange, for two seasons observations have been made on the yield of two comparable halves of a Granny Smith apple planting under schedules of lime sulphur and of thiram. In the first, a heavy crop season, the thinning effect of thiram was evident. The lime sulphur treated section yielded about nine bushels per tree and the thiram about six bushels. In the second, a light crop season, the lime sulphur section carries less than one bushel per tree whilst on the thiram section the yield was approximately five

bushels per tree. If such yield differences are maintained they will more than offset the higher cost of the thiram schedule.

An experiment at Batlow demonstrated that organic mercury fungicides applied at low concentration after infection has occurred provide satisfactory and low cost control of black spot on young non-bearing trees.

Apple Black Spot Eradication Experiments.—Investigation into possible black spot eradication by spraying before leaf fall with an eradicant fungicide were continued. In a small orchard at Yetholme, sprayed in autumn with phenyl mercuric chloride (0.3 per cent.) and not sprayed this growing season, no lesions developed until early December, whereas in neighbouring orchards which received a full schedule of spring sprays, but no eradicant autumn spray, lesions were present early in November. Infection conditions were severe. It is conceivable that the black spot fungus was eradicated from the autumn treated orchard and that the lesions which appeared on December 5th originated from inoculum blown in from neighbouring orchards (about one mile away) during a rain period on November 19th and 20th.

In a small orchard at Orange, sprayed in autumn with phenyl mercuric chloride (0.1 per cent.) a few trees were left unsprayed during the spring. On Granny Smith a few lesions appeared about mid-November but Delicious remained free of infection throughout the season.

A non-bearing planting of mixed varieties at Batlow was sprayed in autumn with phenyl mercuric acetate (0.1 per cent.). Some lesions developed about mid-November but although no spraying was done throughout the growing season the block did not become heavily infected. This was in marked contrast to other unsprayed blocks of young trees in the district.

In each of the above experiments it is now believed that isolation from outside sources of inoculum was inadequate. This autumn (1955) further plots established are believed to be sufficiently isolated to obviate the possibility of any large "ascospore shower" being blown onto them. These plots are at Tumorrana (P.M.C. 0.1 per cent.), Orange (P.M.C. 0.05 per cent.) and Maroota (P.M.A. 0.1 per cent.).

The eradicant effectiveness of five concentrations of P.M.C. four concentrations of P.M.A. and four concentrations of P.M.F. (phenyl mercuric dinaphthyl methane disulphonate) were determined in an experiment involving field and laboratory techniques. It was found that P.M.C. was the least phytotoxic of the organic mercury sprays tried, but that all were equally effective as eradicants at equivalent mercury concentration. In terms of P.M.C. the minimum effective concentration was found to lie between 0.1 per cent. and 0.01 per cent. concentration of that chemical. Sprays at four levels within this range were applied to heavily infected trees at Batlow this autumn, and it is anticipated that next spring the minimum effective dose will be determined. The economics of this method of control will then be examined.

Black Spot of Pears (*Venturia pyrina*).—Thiram continued to be more widely adopted for control of this disease, an excellent result was achieved. In the Batlow district, where most growers use thiram for pear scab control, yields have been increasing over the past five years. It is thought that this is due in part to the cessation of lime sulphur spraying schedules.

Powdery Mildew of Apples (*Podosphaera leucotricha*).—Thiram continued to build up in susceptible varieties where sulphur spraying schedules have been replaced by organic fungicide programmes.

Limb Canker of Apples (*Botryosphaeria ribis*).—New infections occurred in many orchards. In the first year of a long term experiment at Dural thiram was not phytotoxic to the sensitive early apple varieties Willie Sharp and Early McIntosh, and it controlled the bud and spur blight phase of the disease.

Virus Diseases of Pome Fruits.—Symptoms of apple mosaic were much less pronounced than last season. Further observations were made in a block of young Jonathan apple trees at West Pennant Hills, where one additional infected tree was detected. Severely affected trees have grown as vigorous as those not affected. Flat limb, believed to be a virus disease, occurs on the variety Gravenstein wherever on other than Gravenstein roots. An attempt was made this season to demonstrate the transfer of an infective principle by inserting buds from an affected Gravenstein shoot into the stem of *Pyracantha Gibbii*. Green crinkle or false sting (virus), which affects Granny Smith in Canada, New Zealand and

some Australian States, was tentatively identified in an orchard at Uralla. If confirmed it will be the first record of the disease in New South Wales. A virus-like condition resembling green crinkle, in Early McIntosh, is being investigated. The condition is in all Early McIntosh plantings so far inspected.

Pear Blast (*Pseudomonas syringae*).—No instance of severe infection was noted.

Brown Rot of Stone Fruits (*Sclerotinia fructicola*).—Substantial losses were sustained, particularly in fruit ripening in late January and in February. In the Murrumbidgee Irrigation Areas losses of up to 50 per cent. occurred with Phillips' Cling but the loss for the entire canning peach crop was about 10 per cent. In a spraying trial on Pullar's Cling peaches the fungicide captan, in two preharvest sprays, reduced brown rot incidence from 39 per cent. to 10 per cent. The plots treated with ziram showed 13 per cent. infection. Both captan and ziram compared favourably to dry mix lime sulphur and both allowed the fruit to colour fully, in contrast to dry mix lime sulphur. Brown rot incidence in fruit transported from Griffith to Sydney was at a minimum where preharvest sprays had been applied.

The fungicide thiram was used in many coastal peach and tableland cherry orchards. Most growers were pleased with the results. In two small scale experiments at Orange thiram applied to nectarines and plums in full bloom caused no injury and did not interfere with fruit set. Thiram used in a full schedule, including the full-bloom spray, gave better brown rot control than resulted from either one or two preharvest sprays. Thiram and captan are now in the Department's control recommendations as alternatives to the standard, sulphur sprays.

Bacterial Canker (*Pseudomonas syringae*).—This serious disease continued to hinder the establishment of young plantings of cherries and apricots. A spraying experiment was commenced at Orange, using streptomycin at 100 p.p.m. on young cherry trees. Spraying commenced in September and is continuing at fortnightly intervals for twelve months in an attempt to determine the period when most infection occurs.

Virus Diseases of Stone Fruits.—No diseases additional to those reported last year have been recognised, but the mosaic disease on plums may now be designated blue pattern.

Shot-hole of Apricots (*Clasterosporium caraganae*).—In further field experiments at Griffith it was evident that a thiram spray at shootfall should be added to the control recommendations. Thus the disease can be brought under control within one season, whereas control was previously sought by slow elimination extending over a period of three years.

The cause of "false shot hole" has not been resolved. It is economically insignificant.

Root Rot (*Phytophthora cinnamomi*).—This disease again caused very severe losses in peach trees and stocks in nurseries and much damage to young peach plantings in orchards.

Rust of Prunes (*Puccinia pruni-spinosae*).—An experiment on prunes at Young demonstrated that weak Bordeaux mixture foliage sprays are superior to lime sulphur and to thiram for rust control but cause some foliage injury. It was again demonstrated that Bordeaux mixture at bud swell does not help prune rust control at Young.

Black Heart (*Fusicoccum gublerii*).—This occurred in an apricot orchard at North Koraleigh on land with no history of tomato or potato culture. This is unusual, and it is assumed that the trees were infected in the nursery or carried some infested soil.

Crown Gall (*Agrobacterium tumefaciens*).—Seedlings of two self-fertilised white-fleshed peaches and seedlings of the yellow-fleshed Pullar's Cling, which is commonly used in nursery practice, were grown in crown gall infested soil to compare their susceptibility to crown gall. An assessment will be made this winter (1955).

Cherry Leaf Spot (*Coccomyces hiemalis*).—No further evidence of this disease has been detected since eradication measures were taken in 1950.

Concentrate Spraying.—Some observations have been made on the adoption of concentrate spraying in the M.I.A. Black spot of pears was controlled with a concentrate spray programme on two different farms. Peach curl, a good disease indicator because of its more regular occurrence in the M.I.A., was controlled by D.M.C. at thrice, and Bordeaux at twice normal concentration. Bordeaux at four times normal concentration can be applied to peaches as the October rust spray

without increasing the risk of copper injury to the foliage. Concentrate spraying at early blossoming for shot hole control does not affect fruit setting.

The heavy suspension sprays have given rise to some difficulties. Bordeaux mixture can be satisfactorily handled by the machine provided the concentration is not too great and the hydrated lime is free of grit; but dry mix lime sulphur causes too many blockages. The development of concentrate spraying for M.I.A. conditions, particularly on deciduous fruits, is regarded with optimism.

DISEASES OF TROPICAL FRUITS.

Banana Top of Bordeaux.—Successful control was again maintained, the incidence of the disease being slightly lower. Figures compiled by the Division of Horticulture showed 2,850 infected plants compared with 3,114 for the previous year. As the number of acres planted to bananas increased by approximately 1,000 acres, the percentage of banana top per acre was as low as that obtained in the 1952/3 season.

Leaf Spot of Banana (*Cercospora musae*).—Spraying trials compared a number of fungicides with Bordeaux mixture. Good control was obtained with most. Heavy defoliation occurred in unsprayed plantations in the autumn and winter of 1955, following a very wet summer and autumn.

Speckle.—This was again notable despite a relatively low incidence of red spider. An attempt is being made to determine whether the parasitic fungus *Ramichloridium musae* is associated as in Surinam.

DISEASES OF GRAPES.

Black Spot and Downy Mildew.—In trials at Leeton, phenyl mercury nitrate proved ineffective for black spot control (*Elsinoe ampelina*). Thiram and ziram again were outstanding, better than Bordeaux mixture. For downy mildew (*Plasmopara viticola*) control ziram showed promise but thiram was ineffective. Some vineyards in the Tocumwal and Orange districts where thiram was used throughout the season suffered severe downy mildew. In a trial at Orange zineb applied at monthly intervals gave downy mildew control equal to that of Bordeaux mixture. In a trial in the M.I.A. Doradilla vines sprayed with zine Bordeaux 10-2-7-100 out-yielded vines sprayed with Bordeaux 6-4-100 despite the low amount of copper and the relatively inefficient control of black spot. Presumably this was due to correction of zinc deficiency, though no symptoms were observed. The yield of ziram-treated vines was also better than the Bordeaux treated, possibly for the same reason, though downy mildew control was less effective.

Powdery Mildew (*Uncinula necator*).—Appeared at Koraleigh where ziram in place of Bordeaux mixture, is now used exclusively for black spot control. In vineyards at Orange thiram and zineb did not control powdery mildew.

Botrytis Moulding.—Rain and periods of high humidity throughout the autumn led to considerable moulding of maturing wine grapes in the Hunter River area. Heavy losses were experienced. Moulding of wine grapes also occurred in M.I.A. and only 11,000 instead of the anticipated 23,000 tons were harvested. The heaviest losses from bunch rots occurred in vineyards where downy mildew was controlled and foliage was dense.

At Orange a trial of zineb as a monthly spray gave inconclusive results, as Botrytis development was slight on maturing black muscat grapes. The weather was fine and dry for some time prior to harvest. However, slight moulding occurred on treated vines, and good control seems unlikely in a bad season. In the lower Murray area heavy losses of sultanas were anticipated, and some moulding on vines and racks occurred. However, the advent of dry hot weather for the main part of the harvest prevented any extensive loss, and no results were obtained from small scale spraying and dusting trials using zineb sprays and pentachlorophenyl dusts. At Koraleigh, however, humid weather persisted and some losses occurred from moulding on vines and racks. In a small scale trial sodium orthophenyl phenate incorporated in the hot dip, followed by sulphuring on the racks, gave good control without residual flavour.

Dying Vines.—Further isolations were attempted from material collected in the Koraleigh area. So far no isolates have reduced the disease in inoculated sultanas.

Bunch Stem Die-back.—In the Molong and Orange districts a condition affecting the maturing bunch has increased during the last few years. The symptoms are death of sections of bunch stem and wilting of the fruit. Investigation of cause and control have commenced.

DISEASES OF BERRY FRUITS.

Powdery Mildew (*Sphaerotheca humuli*) of Strawberry.—Appeared in plantings of variety 1953.1 which was released for trial to a few growers last year by the Division of Horticulture. This disease has not been observed on the varieties at present grown in N.S.W. The new variety has been discarded because of its susceptibility.

Virus Diseases of Strawberry.—Are now so widely prevalent that the commercial growing of this crop has declined to a very low level. A collection has been made of a number of older varieties, and an attempt will be made to free these by heat therapy.

DISEASES OF ORNAMENTALS.

Ray Blight (*Ascochyta chrysanthemi*) of Chrysanthemum.—In April, 1955, this disease was reported from the metropolitan area for the first time, but may have been present for many years. Early blooming varieties seem to be more severely affected. Investigation of the pathogen and control have commenced.

Powdery Mildew (*Uncinula australiana*) of Crepe Myrtle.—The imperfect stage is on crepe myrtle. The perfect stage, rarely found, was reported from Tamworth in May, 1955.

NEMATOLOGY.

Root-Knot Nematodes.—Identification of the revised species of *Meloidogyne* was continued. Another species, *Meloidogyne javanica*, was found infecting eelworm-resistant peach rootstocks. This species, the only one known to attack Yunnan and Shalil rootstocks, has been found at Gosford, the only area known to be infested in N.S.W.

The search for ecto and endo-parasitic migratory nematodes has been unsuccessful but is continuing.

BACTERIOLOGY SECTION.

Samples of butter and cheese were bacteriologically examined as a check on physical grading. A total of 36 butter samples were examined for total, coliform, yeast, mould and casein digester counts. Twenty-one, or 58 per cent. were found of unsatisfactory biological quality. In many cases, samples which had been graded as satisfactory on the butter grading floor were unsatisfactory from a biological viewpoint.

Water, wine flavouring essence, margarine and a sample of poultry mash were also examined.

Cheese Starters.—The supply of vigorous starter cultures to the cheese industry continued. Two of the original eight New Zealand starters have been replaced with new cultures

because of phage relationships. Regular vitality tests were conducted to maintain a high level of efficiency. Adequate supplies of lyophilised cultures have been procured from the C.S.I.R.O., Melbourne, and the possibility of distributing the starter cultures in this form is being investigated. Comparison of the vitality of these freeze-dried cultures with that of the cultures maintained by daily transfer in skim milk is proceeding. If it is found that the freeze-dried cultures may be distributed the most effective method of reconstitution, for use in the cheese factories, must be determined.

Biological Surveys and Instruction.—Biological surveys of dairy factory and dairy farm premises included investigations of the purity of water supplies and the sanitary condition of factory equipment. The incidence of coliform organisms in the supply of raw whole milk to cheese factories was of particular interest. Instruction in bacteriological technique was given at factories investigated.

Nitrogen-fixing Bacteria.—The peat culture industry is now established commercially in this State, and this laboratory is working on some of the problems associated with peat culture production. The work includes a study of the effect of various factors on the competition between strains of root-nodule bacteria in peat. Results indicate that some strains may completely dominate others, possibly with important practical implications. Routine testing of commercial peat cultures continued, and included counts and plant tests to determine invasiveness and effectiveness of the bacteria. The commercial firms are regularly supplied with fresh mother cultures of strains. Field trials in the Walcha district last season showed a very significant response to heavy inoculum rates on lucerne sown into a rather dry seedbed. Nodulation of subterranean clover was found to be reduced by heavy applications of acid superphosphate. Trials have been sown at Capertee this season in collaboration with the Plant Nutrition Unit, to study the effect of various fertilizers on nodulation. At Berry, *Rhizobium* strain trials have been laid down in conjunction with fertilizer and clover species trials.

Several new strains have been obtained from various sources in the past year. These are being tested in the laboratory for effectiveness, by the agar-tube technique. A study of the nodulation of sub-tropical legumes has been planned. This will be done in pots when a new glasshouse reserved for *Rhizobium* studies becomes available.

Bee Diseases.—Of the adult bee disease specimens submitted for examination the majority were Nosema, paralysis, or some form of poisoning. American Foul Brood continued to be the most commonly encountered brood disease.



Bronze Orange Bug (*Zhococoris sulciventris*). Spray control programmes have been developed for this north coast citrus pest which has spread southwards and become common on suburban citrus trees in particular.

(Photo from Gosford Office.)

Entomological Branch.

INCIDENCE OF INSECT PESTS—SUMMARY.

Extensive hatchings of overwintering eggs of the Australian Plague Locust occurred in northern and north western areas of the State in early spring. Control operations on an extensive and unprecedented scale were carried out by landholders and Pastures Protection Boards. Swarms were reduced to a minimum by midsummer when parasites and heavy floodings, later, combined to restrict further development. In late autumn an unexpected invasion of flying swarms from far western and north western areas caused damage in south western districts and deposited eggs over a wide area.

Black beetle swarms appeared early in the spring but little damage occurred, because of heavy spring rains in most of the infested areas.

Queensland fruit fly was active very early in the season and populations built up in some inland northern and north western areas before Christmas. Highly favourable conditions of temperature and humidity assisted in the spread and establishment of this pest almost throughout the State, including the Murrumbidgee Irrigation Area and part of the Murray River district, with consequent restriction on export citrus marketing.

Pasture scarabs damaged improved pastures in many southern areas, whilst other curl grubs were troublesome in crops and pastures in many parts of the State.

Red-legged earth mite infested pastures, cereal crops, lucerne and vegetables in inland areas, especially in the southern districts.

Local grasshoppers of various sorts were prevalent and damaged pastures, vegetables and fruit trees in many places. White fringed weevil attacked lucerne and clovers in the Hunter, Kangaroo Valley and Manning districts. Cutworms seriously damaged irrigated wheat and pasture crops at Barham. Armyworms and sod webworms were abundant and injurious to pastures and lawns on the north coast in autumn. Slugs, crickets and cutworms severely checked newly established sod seeded pastures.

Oriental peach moth caused unusually heavy losses in canning peaches in the M.I.A. Red scale increased considerably on citrus in inland areas in autumn but conditions were not suitable for scale build up in coastal orchards. An infestation of European red mite was observed for the first time in this State in an orchard at Orange. The campaign in collaboration with the Division of Horticulture for suppression of citrus gall wasp infestations in the metropolitan area has considerably reduced the infestations in areas which have so far received attention.

The warm, humid late summer and autumn conditions and extensive inland floods provided favourable conditions for sheep blowfly strike.

Huge populations of mosquitoes were a problem in some areas. Ants, fleas and grass ticks were at times very troublesome to persons, whilst carpet beetles damaged household carpets and woollens in many parts of the State.

The Argentine Ant Eradication Campaign continued satisfactorily as a joint project with C.S.I.R.O. and Local Government bodies. Results of spraying have been generally very good. Sixteen new infestations were discovered during the year and the total known infested area is approximately 2,000 acres.

FIELD AND VEGETABLE CROP PESTS.

Australian Plague Locust (Chortoicetes terminifera).—Winter surveys in 1954 showed that egg laying by the plague locust had been extensive and heavy in north western districts, especially around Dubbo, Trangie, Nevertire, Coonamble and Narrabri. Hatchings occurred throughout these districts in August-September, 1954, and fliers appeared in the earliest sections towards the end of October. Demonstrations, in centres where locust trouble was anticipated, featured the use of boom, windblast and fog machines for application of locust control sprays. Fortified by the experience gained in the 1953-54 season's campaign, landholders were well prepared in advance of hopper development, and a very extensive control campaign, using the insecticides BHC and aldrin, was vigorously prosecuted in most of the infested districts.

The appearance of wasp and fly parasites further reduced swarms during the summer. Extensive flooding in the main outbreak areas further diminished infestations in the autumn.

The unexpected appearance of flying swarms in the Deniliquin district in late autumn was later followed by reports of extensive swarm migration from around Milparinka in the

far north west corner of the State. These fliers moved in a south easterly direction and penetrated to the Murray River and beyond. Other swarms flew in from the direction of Renmark in South Australia and, after causing considerable damage to pastures, deposited eggs over wide areas.

The proposal to run a trial control campaign in one of the major outbreak areas is being proceeded with, and a patrol officer will shortly be appointed to secure timely information on locust breeding and the possibility of new outbreaks. The strategic aim is suppression of an outbreak at the outset rather than control when the plague is already well advanced and migratory swarms are present throughout the country.

Small Plague Grasshopper (Austroicetes cruciata).—This pest was again troublesome in the southern parts of the State and caused damage to pastures in the Narrandera, Hay, Hillston and Balranald districts. An unexplained mortality was reported in a population of these grasshoppers in the Hay district in October, 1954.

Local Grasshoppers.—The wingless grasshopper (*Phaulacridum vittatum*) proved very troublesome in tableland districts. It damaged pastures, vegetables and fruit trees. Other grasshoppers reported included the yellow winged locust (*Gastromargus musicus*) which damaged pastures, grass seed crops and young trees in the Cooma district; *Kosciuskoa tristis* which wiped out much of the ground cover, especially snow grass, on the snow leases above the timber line; and the spur throated locust (*Austracris guttulosa*) which damaged vegetables and fruit trees in many inland areas.

Black Beetle (Heteronychus sanctae-helenae).—Large populations of black beetle overwintered, and became very active during a warm spell in early spring. The pest damaged early sown maize and potatoes. Very wet conditions later in the spring caused a marked decline in beetle activity, and little further injury occurred excepting in the far south coast area where rainfall had been light. Although dieldrin applied to a maize crop at planting time has been shown to provide a prolonged kill of beetles, such treatments have not given a useful degree of protection under conditions of heavy infestation.

Pasture Scarab (Aphodius howitti).—Extensive damage to improved pastures by pasture scarab occurred in winter in southern districts. Many landholders applied control measures for the first time. BHC at rates as low as 2 oz. of the active ingredient per acre gave satisfactory control. Some 20,000 acres were treated against this pest and red legged earth mite in the Wagga district alone.

Red Legged Earth Mites (Halotydeus destructor and Penthalaeus major).—Subterranean clover in pastures was heavily infested by *H. destructor* in southern districts whilst lucerne, pasture and cereal crops were attacked in northern areas. DDT at 4 oz. per acre was used effectively against these pests.

Armyworms and Cutworms (Noctuidae).—About 500 acres of wheat were destroyed at Barham in the winter but cutworms were little attracted to subterranean clover or oats. DDT sprays were effective. Flood irrigation in August killed most of the survivors. Armyworms reached plague proportions on the far north coast in autumn, damaging pastures, parks and playing fields. Farmers who used insecticide-fertiliser mixtures based on DDT or dieldrin obtained good control. Armyworms also did much damage to oat crops in the Hunter Valley.

Sod Webworms (Psara licaresalis).—These caterpillars appeared in huge numbers, following swarms of moths in the autumn, and damaged pasture grasses and lawns along the north coast. Applications of DDT at 8 oz. per acre were effective.

Crickets (Gryllulus commodus and Pteronemobius regulus).—Both caused damage to clover plants in sod seeded pasture on the north coast, but BHC and bran baits gave good control. Pasture seedlings were attacked in the M.I.A.

Curl Grubs (Scarabaeidae).—Larvae of the scarab beetle *Othonius batesi* extensively damaged plains grass on black soil at Nevertire. Other scarabs damaging pastures, crops and shrubs were the pruinose scarab (*Sericesthis pruinosa*) and *Rhopaea* sp.

Wheat Root Grub (Anodontonyx noxious).—Backward wheat crops on red soils suffering from insufficient moisture were damaged. Lindane at 8 oz. per acre, applied with superphosphate through a combine, had no effect against late stage larvae either when applied to the surface or drilled in to a depth of 1½ inches.

White Fringed Beetle (*Pantomorus leucoloma*).—Established lucerne was severely damaged at Bulga and Taree by larvae of this weevil, and adults fed on red clover at Kangaroo Valley in the autumn. Soil applications of 5 lb. BHC active ingredient or 3 lb. DDT per acre gave no control of larvae.

Potato Moth (*Gnorimoschema operculella*).—Satisfactory growing conditions hindered the development of heavy infestations. DDT spraying, now generally accepted practice, has greatly reduced losses from this pest. Experiments have recently shown that the dosage of DDT used against this pest may be safely reduced to $\frac{3}{4}$ lb. per acre.

Green Vegetable Bug (*Nezara viridula*).—This pest was less abundant than usual, but infestations were heavy in central western vegetable and lucerne seed crops. Good results followed the use of lindane against this insect on lucerne.

Tomato Caterpillar (*Heliothis* sp.).—Routine DDT treatment of tomatoes has practically eliminated the tomato crop problem. In some districts boom spraying with DDT has become standard practice in lucerne seed crops, but where treatment was not carried out these caterpillars were active and injurious.

Monolepta Beetle (*Monolepta australis*).—Swarms invaded maize crops and fruit trees on the north coast in the summer and were more prevalent than usual. At maturity, only scattered grains filled in the heavily attacked maize crops whilst in others the secondary cobs failed completely. DDT dusts or sprays are extremely effective.

French Bean Fly (*Agromyza phaseoli*).—Infestations followed the normal pattern except that in one instance adults were seen in moderate numbers depositing eggs in an early bean crop in August at Gosford. Populations were extremely high in summer and autumn on the north coast. In experimental sprayings, lindane, parathion and dieldrin all gave good control, as did the standard DDT recommendation.

Leaf Eating Ladybird (*Epilachna* 28 *punctata*).—Adults and larvae were very abundant in the spring and summer. They fed very heavily on coastal potatoes and cucurbits.

Cabbage White Butterfly (*Pieris rapae*).—This was not prevalent in most coastal districts but in some inland areas and on the far north coast was abundant and destructive in autumn. Thorough, routine applications of DDT effectively controlled it.

Garden Centipede (*Scutigera* sp.).—Germinating spring bean crops were damaged in the Gosford district for the second year in succession on one property.

Slugs (*Agriolimax* sp.).—Destroyed considerable acreages of clover on the north coast and in association with crickets considerably damaged sod seeded pastures. They also troubled vegetables and home gardens.

FRUIT PESTS.

Citrus Red Scale (*Aonidiella aurantii*).—Unfavourable autumn weather, combined with attacks by the wasp parasite *Aphytis chrysomphali* and the ladybird *Orcus chalybeus* and other predators, reduced populations of this scale to a low ebb under coastal conditions. Inland, a very marked increase in infestation occurred in late autumn. Extensive experiments have been laid down in most of the principal citrus districts to compare, to standard oil spray treatments, the organic phosphorus insecticides parathion, malathion, chlorothion and diazinon, in different combinations and dosages.

Orange Worms (*Tortrix postvittana* and *Harmoloma miserana*).—Young trees sprayed at Leeton with cryolite or DDD showed good control of *Tortrix* on foliage of citrus. Fruit counts in an experiment at Gosford showed that DDD gave appreciable control of larvae of *H. miserana* but dieldrin, parathion, diazinon or cryolite were not promising. Sprays of DDD at 0.1 per cent. gave very good control on pears at Yanco.

Snails (*Helix aspersa*).—Constant wet conditions in the autumn stimulated the development of snails. They injured coastal and some inland citrus. Bordeaux sprays gave control.

Green Peach Aphid (*Myzus persicae*).—Infestations were heavy and widespread. The worst infestation for years occurred at Orange. The aphid persisted well into the spring owing to cool, wet conditions and the absence of predators. Winter sprays of DNC or tar distillate controlled it but DDT in semidormant oil was generally unsatisfactory. Post blossom sprays of DDT tended to stimulate infestations but HETP,

parathion or malathion sprays were satisfactory. When used through a concentrate sprayer parathion gave very satisfactory control at Orange.

Oriental Peach Moth (*Cydia molesta*).—Spring populations of moths were at a high level in the M.I.A. and the high, late summer humidities enabled a summer generation to develop. The consequent infestation of Pullars Cling peaches was serious in some orchards. Infestations were not important where the recommended DDT programme was followed.

White Wax Scale (*Ceroplastes destructor*).—Mild, moist conditions favoured the development of this scale and little natural mortality occurred in the summer. Very good control followed the use of properly timed applications of white oil sprays. Similarly timed organic phosphorus sprays were also effective. No control of wax scale has been obtained with the organic phosphates at other periods. In fact there are strong indications that they stimulate wax scale infestations if applied in the spring.

White Louse Scale (*Unaspis citri*).—Infestations in some districts were reduced by the predatory caterpillar *Batrachedra* sp. Combinations of parathion with Bordeaux sprays in the spring or the summer have given very good control, whilst colloidal or dispersible sulphur, in combination with Bordeaux, offer a practical and satisfactory dual purpose spray, and avoid the dangers associated with Bordeaux and lime sulphur in sequence.

Purple Scale (*Lepidosaphes beckii*).—This is an important scale in lowland orchards at Gosford and may be important in the initiation of breakdown in mature fruit due to stem end rot. Current investigations are seeking for purple scale control a spray programme which will fit in with disease control Bordeaux schedules and also control white wax scale. Organic phosphorous compounds are being tested.

Brown Olive Scale (*Saissetia oleae*).—This was widespread on young trees in coastal orchards and especially prevalent on trees in some inland areas where red scale is not a problem. The predatory noctuid caterpillar *Catablemma dubia* appreciably reduced infestations, and withstands attention by ants, but unless ants are suppressed the more useful wasp parasites exercise little control.

Citrus Gall Wasp (*Eurytoma fellis*).—The extent of infestation by this pest in mid coastal areas was further defined and an infestation was discovered in the suburb of Vaucluse. No evidence has yet been seen in any of the important commercial citrus producing areas though some heavy infestations have been seen at Brooklyn, some twenty miles south of Gosford. Attempts to eliminate the Brooklyn infestations, and to reduce the infestations in Sydney suburban areas are in hand.

Fullers Rose Weevil (*Pantomorus godmani*).—Mid-summer soil treatments with 1 or 2 lb. dieldrin per acre did not prevent weevils emerging and infesting citrus trees at Wyee. DDT or dieldrin at 0.1 per cent. applied as sprays to young citrus trees were effective against adult weevils, and no re-infestations occurred. BHC, aldrin or cryolite were not so effective in preventing re-infestation.

Banana Beetle Borer (*Cosmopolites sordidus*).—Plantations which carried out recommended sanitation and cultural methods were generally not menaced but, nevertheless, plants of which the root systems were disturbed by cyclonic gales were usually seriously infested and weakened by this pest despite rigorous cap poison baiting programmes. The practice of destroying unwanted stools by injection of organic herbicides attracted tremendous numbers of beetles to the dying plants. Where this operation was inefficiently performed, beetles continued to breed in the plants.

Banana Rust Thrips (*Scirtothrips signipennis*).—With the exception of favourable locations this thrip caused little injury, and there was insufficient blemished fruit for markets to react adversely as in the previous season. Following that season's serious losses a vigorous extension campaign demonstrating control methods was carried out. It increased by 3,500 acres (270 per cent.) the area treated.

Red Spider (*Tetranychus telarius*). was not important except for short periods in the early summer. Unfavourable weather and the ladybird predator *Stethorus vagans* kept populations low. Appreciable damage occurred on bananas which had received DDT schedules for control of rust thrips. Correlation between the incidence of "speckle" and red spider was not apparent this season.

Leaf scorching of pears in the M.I.A. was shown to be largely due to red spider infestation, and transpirational stress to be of minor significance. Tests with various materials at Yanco showed that chlorocide 0.02 per cent., malathion 0.05 per cent., and chlorbenzilate 0.05 per cent. were slightly superior to PCPPBS 0.04 per cent., but systox 0.025 per cent. was better than all other materials tested.

Concentrate Spraying.—Investigations at Orange and in the M.I.A. showed that the concentrate sprayer as developed by Dr. Marshall and associates in Canada gave good control of codling moth on pears with amounts of DDT per acre below those used in hand spraying. It also gave good control of green peach aphid on peaches, and of red spider and codling moth on apples.

Queensland Fruit Fly (*Dacus tryoni*).—Fruit fly was of unusual severity on the coast, commencing early in the season. The main factor seemed to be the cyclonic November. November is generally dry and shows the greatest saturation deficit. With an early large coastal population of flies, and cyclonic conditions continuing into autumn over most of the State, it is not surprising that nearly Statewide infestation was recorded.

Further to work which had shown that systemic insecticides could be used as sprays to prevent maggot development in fruit, the current new systemics were appraised. Of these it was found that L13/59, a diptericide claimed to be of low mammalian toxicity, possessed highly useful systemic properties in fruit and that its use as a spray held practical possibilities. Field investigations on the fly were hampered by the cyclonic conditions but there were indications that stone and pome fruits could be protected by a thorough cover-spray with 0.1 per cent. L13/59 at the onset of egg laying, followed by 0.05 per cent. L13/59 at weekly intervals.

Rots follow oviposition in citrus fruits and tomatoes. Therefore destruction of adult flies remains an important aspect of control.

WEED PESTS.

Crofton Weed Stem Gall Fly (*Procecidochares utilis*).—Very good establishment of flies on the far north coast resulted from releases of material provided by the Biological Section of the Queensland Department of Lands. A spectacular spread has occurred. Other releases made at Gloucester on the lower north coast became established and spread

well, although results at first did not appear promising. A colony was established at the Sydney north shore suburb of Roseville. The flies persisted there but little spread has occurred.

Heliotrope Moth (*Utetheesia pulchella*).—Reports from several southern districts indicated that the larvae have reduced stands of Paterson's Curse (*Echium* sp.) over wide areas.

Lantana Bug (*Teleonemia scrupulosa*).—This insect occurred in very small numbers on the north coast. It exerted no control over its host.

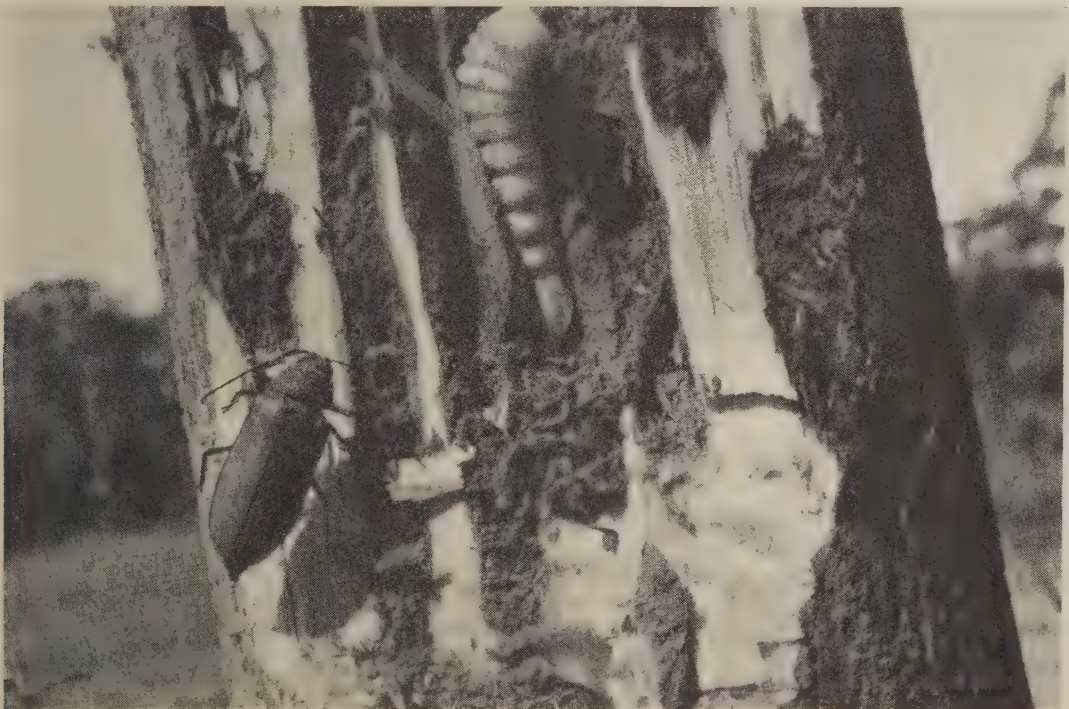
STORED GRAIN PESTS.

Experiments with different insecticides against rice weevil (*Calandra oryzae*) and grain moth (*Sitotroga cerealella*) in shelled maize showed that carbon bisulphide, carbon tetrachloride, carbon tetrachloride plus ethylene dichloride, and chloropicrin, all gave good control when the maize was treated in closed containers. DDT dust 2 per cent. or BHC dust 0.13 per cent. gamma, at the rate of 2 oz. per bushel, gave excellent protection in open storage, as did lindane 0.25 per cent. at 1 oz. per bushel. Magnesite at 2 oz. per bushel gave good protection against grain weevil but not against grain moth. Pyrenone grain protectant was poor against both weevil and moth.

TIMBER PESTS.

Termites (*Isoptera*).—A co-operative investigation with the Division of Wood Technology, N.S.W. Forestry Commission, revealed that susceptible timber blocks placed in a circular trench around active mounds of *Coptotermes lacteus* were not attacked after a period of 12 months where these had been treated with chlordane or dieldrin. Blocks treated with pentachlorophenol, sodium pentachlorophenate, dichloroethyl ether, creosote or kerosene, were attacked in varying degree.

Experimental treatments of foundations of termite infested structures at Wagga and in the metropolitan area with aldrin, dieldrin or chlordane give promise of long term protection. Treatment is greatly simplified if carried out during the early stages of building construction. That is envisaged as a routine procedure in badly termite infested areas.



Cerambycid Beetle Borer (*Agrionome spinicollis*).

The larva and adult in this instance are on a severely damaged Tung tree. Wood boring insects do great injury to forest, fruit and ornamental trees. Proper tree health helps to prevent their attack.

(Photo from Gosford Office.)

Especially after extended periods of wet weather, the termite *Nasutitermes walkeri*, which builds "nigger head" nests in trees and is not usually regarded as an economic pest of timber in buildings, caused trouble in buildings in northern suburban areas of Sydney. Large covered runways sometimes cover the surface of the ground for distances of up to 100 yards. White arsenic dust treatment appears to be particularly effective against this species.

Wood Borers.—Many enquiries were received concerning furniture beetle (*Anobium punctatum*) and powder post beetle (*Lyctus brunneus*). It is probable that most of the older homes in Sydney containing susceptible timber show some infestation by the former. Reports of commercial and private use of dichloroethyl ether for borer control indicate that it is very effective and is superseding older methods.

An unusual infestation of the Bostrychid *Xylion cylindricus* occurred in a large spotted gum bearer which contained 50 per cent. sapwood, and with a moisture content of 26 per cent. after being in position in a house for twelve months.

HOUSEHOLD PESTS.

Ants (*Pheidole* sp. and *Monomorium* sp.).—There were many complaints of ant nuisance in houses after the continuous wet weather. On the north coast large numbers of ants infested dairies and contaminated cream.

Argentine Ants (*Iridomyrmex humilis*).—The Argentine Ant Eradication Campaign was continued in association with the C.S.I.R.O. and Department of Local Government. Sixteen new areas of infestation were found between December 1954, and June, 1955. Eight were in the Auburn Municipality, four in Parramatta Council area, one at Botany, one at Circular Quay (Maritime Services Board area), one at Matraville and one at Arncliffe. Two of the new areas exceeded 20 acres. In all, some 2,000 acres in 83 different areas are now known to be infested. Nine municipalities, two cities (Sydney and Parramatta), one shire and two Maritime Services Board areas are affected. 1,750 acres of infestation were surveyed between February and April, 1955, and no ants were found in 33 areas covering about 270 acres. In the remaining 35 areas covering about 1,530 acres, ants were found on 4.5 per cent. of the properties but the infested areas would be less than 50 acres. The percentage of infestation in these areas ranged from 0.4 per cent. to 48 per cent. A property was deemed infested if only one ant was found.

VETERINARY AND MEDICAL PESTS.

Queensland Cattle Tick (*Boophilus microplus*).—At the Department's request two DDT cattle tick dipping demonstrations were conducted by the C.S.I.R.O. in the summer and autumn to supplement knowledge on the value of DDT for cattle tick eradication. The work confirmed the merit of a well known dip formulation which, on heating and addition to water in a dip, gives a fine colloidal suspension. No ticks reached maturity where cattle were subjected to twelve fortnightly dip treatments in this formulation. In the other trial a small number of ticks engorged on cattle dipped twelve times at fortnightly intervals in a DDT suspension.

Promising results were derived with Ethylene dibromide in efforts to establish a fumigation treatment of plant material before entry into the N.S.W. Quarantine Area from tick infested areas of Queensland.

Sheep Blowfly (*Lucilia cuprina*).—Blowflies were moderately active in the late summer and early autumn, especially in the north western sheep breeding areas. Dieldrin and aldrin were employed by many graziers for both prevention and control of blowfly strike. These insecticides are now firmly established as sheep blowfly preventives and have superseded DDT and BHC. There has been a marked trend away from conventional blowfly dressings, which usually contain an efficient larvicide and an insecticide, to emulsions prepared from dieldrin and aldrin concentrates.

Further work with stabilised pyrethrin formulation strongly indicated that this material does not afford protection against sheep blowfly strike. Investigations are in progress to determine the value of diazinon for blowfly prevention and to obtain additional information on the period of protection given by dieldrin and aldrin, applied as a surface spray and by jetting.

Sheep Lice (*Damalinia ovis*).—Investigations on sheep lice at Tamworth Agricultural Research Station have been temporarily suspended whilst a survey of the sheep lice problem is awaited. Funds for a survey are available from the Extra

Mural Grants for Sheep and Wool Research but there has been considerable difficulty in finding a suitable officer for the position.

ENTOMOLOGICAL COLLECTION.

The following groups have been named and returned by specialists: *Tipulidae*, *Tenthredinoidea*, *Bostrychidae*, *Scholytidae* and *Trogidae* (in part). The following have been sent to specialists for examination: *Trogidae* (in part), *Braconidae*, *Dytiscidae* and *Gyrinidae*. Rearrangements of *Trogidae* (in part), certain *Chalcidoidea*, *Tipulidae*, *Tenthredinoidea*, *Bostrychidae*, *Scolytidae*, *Formicidae* (*Myrmecia* and *Promyrmecia*), *Cerambycidae*, *Asilidae*, *Leptopinae* and certain minor groups have been carried out. The collection was drawn upon extensively by Tuthill and Taylor for a recent revision of "Australia Genera of the Family *Psyllidae*." Two new species, an *Ichneumon* and a *Taeiogonid*, were described from the collection. Mr. Parrott, a New Zealand specialist, has been studying material of *Braconidae* and *Ichneumonidae* and has published two papers in the Proceedings of the Linnean Society and also papers in other journals. The Department has assisted Mr. Parrott by contributing to a fund which allows him to devote full time to this work.

The provision of six new insect cabinets is facilitating orderly arrangement of a big part of the insect collection.

Chemist's Branch.

CEREAL SECTION.

1954 Crop Year Wheat Quality Problems.—The 1954 wheat crop's general quality was approximately the same as that of the previous season's wheat.

Protein content of the official F.A.Q. sample (11.5 per cent.) was 0.6 per cent. higher than for the 1953 crop whilst protein quality was very slightly lower. Bushel weight of the grain was lower than for 1953 wheat, and moisture content was higher. The official samples caused the London Corn Trade Association to express serious concern. This complaint apparently was based on the reduced amount of flour extractable in milling.

A 1954 crop feature was the more even distribution of quality over the various wheat-growing areas. This reduced the problem of southern mills although most had to purchase some premium wheat to supplement the southern grain quality.

Premium wheat was again keenly sought by millers at harvest time. From the 1954-55 harvest, 4,040,555 bushels of wheat were purchased by local millers at a premium above the F.A.Q. price, compared to 5,223,180 bushels from the 1953-54 harvest. Prices paid for 1954-55 premium wheat, however, ranged from 2d. to 3s. 8d. per bushel, the average premium being 1s. 9.11d. The total premium paid was £355,494. For the 1953-54 crop, premium prices ranged from 2d. to 3s. 1d., the average premium being 1s. 3.95d.; and the total premium amounted to £347,164. Because the local market is highly competitive and millers were most anxious to secure sufficient premium wheat, the Chemist's Branch received many enquiries relative to the type of premium wheat available and its location.

Cereal Control Work.—507 samples of flour were examined for provision of export flour certificates, compared to 702 samples in 1953-54 and 500 in 1952-53.

The decrease reflected the restricted export of flour from the State. Moreover, many of the consignments tested were of relatively small tonnages, submitted by private exporters.

Every effort has been made to assist millers to maintain the quality of their export flour at a high level. The quality of flour exported has been higher than for some years. Most samples were significantly higher quality than the accepted standard for export flour.

Wheat exported from the State is normally sold as F.A.Q., required to conform only to the official standard set by the Grain Trade Section of the Sydney Chamber of Commerce. This year the Australian Wheat Board received a contract to supply wheat to a specified minimum protein content, indicative of the highly competitive condition of overseas markets. It requested information as to the areas from which wheat might be drawn to fulfil the contract. This was possible, because a representative sample of wheat from the various grain elevators throughout the State is tested each year when the harvest is completed. Further samples from country elevators considered likely to contain wheat of the required protein content were tested, and it would appear that this type of contract can be fulfilled successfully by eliminating certain silos.

Fifty-six samples of flour were tested on behalf of the Department of the Navy, to determine whether they complied with certain breadmaking and ship storage specifications and whether they were suitable for use at home stations and/or for shipment overseas on behalf of the Royal Navy and Royal Australian Navy. The Department of the Navy is notified of and the particular mill is assisted to rectify a deficiency.

Fifty-three samples of flour were examined on behalf of various Government institutions, to determine their suitability for bread making.

Cereal Instruction and Advisory Work.—With decreasing demand for export flour and increasingly competitive local market, millers are keenly interested in means whereby the quality of their flour may be raised to and maintained at a high level. Most mills now recognise the necessity for laboratory control of flour quality and are prepared to provide laboratory facilities if the mill capacity justifies the capital outlay. The demand for laboratory control of flour quality is stimulated also by the expanding demand for high protein flour used in "starch reduced" bread.

Several requests for assistance in establishing and extending cereal laboratory facilities in flour mills were received. Much advice on equipment and its operation has been given to millers establishing control measures. Demonstrations and training have been given to mill personnel and an officer of the Bread Research Institute.

Interchange of information and ideas with overseas authorities has been regularly conducted to mutual advantage. This Branch is informed on the quality of all wheat arriving in U.K.

Participation in the Sydney Conference of the Cereal section of the Royal Australian Chemical Institute facilitated in particular an exchange of information and ideas with other States' officers.

Wheat farmers' interest in production of high quality grain to sell at a premium, has been stimulated by high world stocks of wheat and the fact that even local markets are demanding better quality. At a country show where a Chemist's Branch officer judges the wheat, and bases his awards on wheat quality, local farmers are especially interested. The points scales provide a means of appreciating how millers arrive at the premium they are prepared to pay for high quality grain.

Milling and judging of wheat entries in the R.A.S. competitions called for an intensive effort to complete results on time, because of the late crop and an early Show.

The Wheat Grading Committee has considered further evidence on the desirability of a system for grading wheat at points of receipt. It has proposed a trial classification, to be carried out during the forthcoming wheat harvest.

Mill Room Operations.—939 wheat samples were received, and 789 were milled:—135 from plant breeders, 275 from Experiment Farms, 102 from farmers, 196 from silos, 65 from R.A.S. activities, 16 from miscellaneous services.

Seven hundred and ninety-five bushel weight determinations and 984 moisture determinations (854 for wheat and 130 for other grain) were carried out.

There was the usual demand for wheat samples and brochures by scholars engaged in a "Wheat Project" in schools.

Arising from publicity given to the war-time evolution, in this Branch, of processed wheat for cleaning internal combustion engines, many enquiries were received. The British Millers Research Association was among the enquirers.

"Boulgour", Product of Processed Wheat.—Of special interest and value was the production of samples of a palatable product of processed wheat called "Boulgour." Research was carried out and data were given to wheat processors in N.S.W. and South Australia. It is thought that if the product was judiciously placed on Asian markets, much of our surplus, low protein quality wheat could be turned to profit. The best Boulgour is made from white wheat and we have a freight advantage over the Americans, who are giving attention to the product in relation to Asian sales.

DAIRY CHEMISTRY.

Factory Advisory Service.—Pressure of other work prevented a dairy factory advisory service this year.

Butter Analysis.—The annual analyses of the samples of butter submitted through the Division of Dairying for the Sydney Royal Show were not possible, owing to laboratory

painting operations. Nineteen samples were analysed for moisture and salt for the Dairy Produce Factory Managers' and Secretaries' Conference.

Testing of Dairy Glassware.—8,993 pieces of dairy glassware comprising Babcock milk and cream test bottles, milk and cream pipettes, and thermometers, were tested, a decrease of 4,433 when compared to the previous year's record of 13,426 articles tested. Substantially more pipettes and thermometers were tested. Milk and cream flasks were considerably less.

Quality of the glassware was lower than in 1953-54. Of the cream flasks, 1.5 per cent. had faulty graduation marks, as compared to 1.0 per cent. in 1953-54. Of the milk flasks, 16.5 per cent. had faulty graduation marks, compared to 7.6 per cent. rejections in the previous year. A very large increase in thermometer rejects was recorded, 56.8 per cent. as compared to 20.4 per cent. in the previous year, because of broken columns and incorrectly placed scale divisions. The unsatisfactory reject position has been taken up with the manufacturing companies.

Pipettes also showed a deterioration in quality, 4.4 per cent. rejects as compared to 2.2 per cent. in the previous year. Again the main defect in pipettes was incorrect orifice diameter.

WATERS SECTION.

Western Division Conference.—The senior chemist attended at Bourke the Annual Conference of Pastures Protection Boards of the Western Division and Western Division Graziers' Conference, where the maximum cost at which it would be economical to demineralize saline water for stock use was discussed. The conference referred the matter to the individual P.P. Boards for report. In due course the C.S.I.R.O. and Department of Agriculture will be informed of the collective views.

Demineralizing of Saline Waters.—Several methods of demineralizing saline waters for stock and/or irrigation waters are being investigated in various parts of the world and the Branch has been keeping in touch with developments, overseas and local. Examples are selective membranes, electrodialysis, vapour compression distillation and solar energy distillation. So far no method has proved economically practical.

Analyses have been carried out on behalf of the designer of a patented apparatus using solar energy. Experimental work reported by the C.S.I.R.O. in *The Desalting of Bore Water by Solar Distillation* has been studied.

General comment on the composition of N.S.W. waters and salinity limits for stock has been supplied to the Division of Animal Industry.

Selection of Sites for P.W.P. Bores.—Two sites were chosen in the previous year for new P.W.P. bores on the difficult Wilcannia-White Cliffs stock route. One has been completed.

General Water Analyses.—Six hundred and seventy-two samples were received for analysis, to determine suitability for stock and irrigation use. Of these, 324 were forwarded by the W.C. & I.C. Many miscellaneous enquiries concerning water problems were also met.

Fluorine Analyses.—Two hundred and thirty-six of the samples forwarded by the W.C. & I.C. were analysed for fluorine content.

Rainwater Analyses in the County of Cumberland.—A preliminary investigation into the chemical content of rainfall within the County of Cumberland was recently completed. Main interest was centred in the chloride content, but sodium, potassium, calcium and magnesium determinations were also made.

That salts are present in rainwater has long been realised but little or no work has previously been done in N.S.W. on the question of cyclic salt, as this salt precipitated with the rain is known.

During February and March, 1955, rainfall was collected at twelve sites in the County of Cumberland, extending from South Head to Kurrajong. The rainfall figures in points were also recorded.

The rainwater samples for each site were collected separately at the end of February and at the end of March, concentrated by evaporation, and analysed. The figures showed a definite decline in salt content as distance from coast increased, but there seemed to be little correlation between total

rainfall and amount of salt. It seemed that, for a particular site, the amount of salt deposited in a given time would be the same whether 1 inch or 6 inches of rain fell.

The figures were for a period of one month only, but indicated that quite a large amount of salt is deposited over twelve months, varying in the Sydney area from several cwt./acre on the coast to sixty pounds/acre forty miles inland at Richmond.

MINOR ELEMENT AND PLANT NUTRITION SECTION.

Field Trials.—In co-operation with the Division of Plant Industry intensive field trials have been established in the Walcha, Capertee, Willow Tree and Glen Innes districts to study sulphur, lime, boron and phosphate treatments for establishment and maintenance of pastures.

The sites chosen to investigate sulphur included types of soils which contained different levels of this element in relation to phosphorus. In the Willow Tree district the black soils derived from basalt responded initially to sulphur applications without the use or pre-use of any other element. In the Walcha area the use of phosphorus was necessary before any response to sulphur was registered. The soil was derived from shale rock. At Glen Innes the soils investigated had received adequate phosphate, in the form of superphosphate, but sulphur deficiency symptoms appeared unless fertilisers containing sulphur were continually used in the topdressing programme.

Gypsum.—Detailed information has been furnished in response to numerous enquiries relating to the use of gypsum in agriculture, the frequency of use, likely sulphur deficient districts, and the quality of the various products being sold.

As a basis for advisory work the Branch has surveyed gypsum samples on offer to farmers. The results indicated that the sulphur content varied from 13.5 per cent. to 15.5 per cent. The best sample contained 17 per cent. inert matter, whilst some of the poorer samples contained more than 20 per cent. inert matter. In some instances, price and quality considerations made it doubtful that the grower would benefit, from an economy viewpoint, by using low grade gypsum in preference to superphosphate as a source of sulphur.

Salt Investigations and Role of Potash.—Salt analyses are normally carried out by determining the chloride content of the material under consideration. The chloride figure thus obtained is frequently compared to the sodium figure determined by means of the spectrograph. Whilst making these comparisons attention during analysis was directed also to the sodium-potassium ratio of some crops.

Potassium and sodium are closely related chemically and it is known also that symptoms of potassium deficiency and sodium toxicity are similar in some plants. From analyses of apple and pear leaves the Chemist's Branch has evidence that in some instances where sodium is high and potassium low, potassium is replaced by sodium.

Particular attention was given to the problem of potassium status of M.I.A. soils. It was previously thought that their potassium status was satisfactory, but analyses of recent samples from the M.I.A. indicated the presence of potash deficiency which could be accentuated by excess sodium. As a result, field officers are now applying potash dressings to some of the suspected trees. It is conceivable that the use of potash fertilisers in certain soils may help to reduce toxic effects of sodium.

Analytical Methods Research.—Research into new methods for determining minerals and other elements in plant material continued.

Methods for determining sulphur in plant material were investigated for speed of operation and accuracy. Most of them are long and laborious. The method devised by Dr. Steinberg of the C.S.I.R.O. is most satisfactory and has been adopted by this Branch.

Methods for the analysis of sulphur in gypsum have been examined. Suitable modifications have enabled the Branch to increase the output of investigational work on this aspect of plant nutrition.

The standard methods used by the Branch for lime and dolomite analysis have been replaced by more speedy "versenate" techniques, after a number of analytical investigations as to comparable accuracy.

Plant Nutrition Survey, "Anderson type" trials.—During the spring and early summer, the "Anderson type" plant nutrition trials established throughout the State were sur-

veyed. An officer of the Chemist's Branch, with a representative of the C.S.I.R.O. and assisted by the respective district agronomist, visited these trials to assess the mineral responses, to take yield cuts and, if necessary, samples for analysis and to record relevant data on pasture establishment. The survey covered most of the eastern and central divisions of the State extending from the Queensland to the Victorian border. Eighty-nine (89) trials were assessed, in eighteen agronomists' districts.

Many districts were in the grip of severe drought in the spring of 1954, but a considerable amount of useful data was obtained concerning deficiencies of major and minor elements in pastures throughout the State.

Superphosphate was found to be almost universally required and in spite of the adverse conditions in many districts 54 of the 89 trials inspected were showing positive responses to superphosphate. Eleven cases of responses to molybdenum and 23 responses to lime dressings (13 responses to heavy dressings and 10 to light dressing) were also noted. Ineffective nodulation was noted to be a common cause of failure in pasture establishment during the 1954 season. Responses to lime were frequently related to the beneficial effect of lime in aiding legume nodulation.

As a result of the survey, several problem areas were noted. In one such area, namely, the Capertee area, field trials and pot experiments by the Plant Nutrition Unit of this Department in co-operation with the district agronomist have now been commenced in an attempt to solve that area's plant nutritional problems.

Consideration is now being given to the implementation of a follow-up State-wide plant nutrition survey in the spring of 1955.

Manganese Toxicity-Deficiency Investigations.—From numerous analyses by the Plant Nutrition Section, manganese deficiency was confirmed as prevalent in the irrigation areas in various orchards. Where manganese levels are below 20 ppm, deficiencies are suspected and sprays are consequently recommended. The manganese deficiencies may be caused by (i) the high pH of the soils and (ii) depletion of the available manganese by leaching. The deficiency is particularly prevalent in citrus.

Analysis of wheat samples submitted from the Tumbarumba district indicated a possible manganese deficiency. Plots in the districts have been treated with manganese to confirm this suspicion. This suspected deficiency is of great interest because manganese deficiency in wheat has not been previously recorded in N.S.W.

Frequently samples are analysed for suspected excess manganese. Unusual symptoms which appear in the form of "tar spotting" on citrus leaves have been investigated. Preliminary analyses indicate that this "tar spotting" may be associated with high levels of manganese. The symptoms are being observed over the growing season and samples are being analysed at intervals.

Zinc Deficiency Problems.—Analyses have confirmed symptoms of zinc deficiency in citrus and pome fruit samples. However, visual symptoms for zinc deficiency are so clear-cut that analyses are not usually required. Zinc deficiency is widespread in New South Wales. In many fruit areas routine zinc sprays are applied to prevent recurrence of this deficiency.

Boron Investigations.—The boron status of plants has been of interest to this Department since 1939 when corking in apples was shown to be due to a boron deficiency. Periodical, analytical checks have shown boron levels to be still marginal for pome requirements in some areas. An interesting sidelight to the boron nutrition of plants is the toxic levels recorded for citrus leaves taken for analysis from trees grown in the western division.

High boron content is due either to boron contamination in irrigation water or to high boron concentration in the soil. The latter is suspected in some of the low rainfall areas. The suspicion was further confirmed when several samples of water showed low levels of boron.

Iron deficiency has been a major nutritional problem on certain soils in the M.I.A. since irrigation has been practised. Soil applications, spraying, and tree injections have met with limited success. Versene compounds containing iron have been used successfully in America to correct iron deficiency, particularly in acid soils.

Preliminary trials have been established on alkaline soils in the M.I.A. to ascertain the efficiency of iron versenates as a control.

Farmer Interest.—The number of requests for speakers at field days, and Agricultural Bureau meetings has indicated abundant farmer interest in plant nutrition problems. Officers from the plant nutrition section of the Chemist's Branch addressed gatherings at Megalong Valley, Walcha, Kurrajong, Hawkesbury, Young, Burton, and Bonville. In addition, they lectured to the respective conventions of district agronomists, stock inspectors, and fruit officers, for further extension to farmers.

SOIL SURVEY UNIT.

Soils Research at Macaulay Institute.—In February, 1955 Mr. (now Dr.) J. D. Colwell returned to the Branch after two and a half years on study leave at the Macaulay Institute for Soil Research, Aberdeen, Scotland. Most of this period was devoted to an investigation of the phosphate status in red loam, or krasnozems soils from the Wollongbar, Dorrigo, Ben Lomond, Glen Innes and Inverell districts of New South Wales. A report of the work is now being prepared for publication. Mr. Colwell also attended field meetings of the British Soil Survey and represented the Department at the 5th International Congress of Soil Science in the Belgian Congo.

Advice has since been received that Mr. Colwell was successful in obtaining the degree of Doctor of Philosophy at the University of Aberdeen.

Wentworth and Wagga Districts.—Visits were made by a Soil Chemist to the Wentworth irrigation area and the Wagga district, to formulate methods for investigation of soil fertility problems in these districts. Detailed recommendations for soil fertility investigations have been prepared.

War Service Land Settlement Surveys.

This survey, commenced in March, 1954, has continued. In December the field work was completed, involving the Stage III survey of 21,200 acres and the collection of soil samples.

Some 220 soil samples from 36 soil profiles representing 26 soil types are being analysed, prior to preparing a soil and land use classification of the area for future irrigation development.

A further 631 soil samples were collected during the Stage II and Stage III phases of the survey, for estimation of total soluble salts, chlorides and pH. The information will be of a considerable value in evaluating the land use potential under irrigation.

Detailed War Service Land Settlement Surveys.—The detailed surveys carried out this year were:—

- (i) Part of Werai-South Estate, Wakool Irrigation District; a small area along the Niemur River.
- (ii) Part of Burrawang South Estate, Jemalong Irrigation District; a small area.
- (iii) Corinella Estate, Jemalong Irrigation District; a small area.

Surveys for Water Conservation and Irrigation Commission.

Billabidgee Survey.—This survey, begun last year, continued for a short period but was discontinued for organisational reasons.

Special Survey.—Two officers of the Soil Survey Unit took part in a special survey of Tullakool, to assist in the solution of a difficult land use problem. The officers participated in the compilation of the report.

Other Surveys.—Some deep boring work was carried out on Warrawidgee Estate and south of the M.I.A. The object was to study the depositional pattern on the plains and thus gain some ideas of the origin and age of certain unusual layers appearing at the surface. A report on this work is in compilation.

Dry Land Surveys.

County of Cumberland Soil Survey.—The map has been drawn up and the report in two sections, (i) soil survey and pedology, (ii) land use, is near to completion.

In conjunction with this survey, specialised work has been carried out on the depositional pattern and the alluvial soils along the Nepean River and tributaries.

Soil Petrology.—Special microscopic techniques have been adopted in studying the mineral suites of soils from the County of Cumberland. This work is being used to determine fertility reserves of soils and to study the relationship of soils to their environment.

Ku-ring-gai Soil Survey.—The bulletin *A Soil Survey of the Municipality of Ku-ring-gai, Sydney* was received from the Government Printer and has been distributed to appropriate organisations and individuals.

Soil Survey of Wagga Region.—A reconnaissance soil survey of the Southern Region, Wagga Headquarters, has been carried out, and a report compiled. A base map has been prepared for future field use. This soil survey will be a major undertaking. It is required as a foundation for the application of future research results to mapped soil types throughout the Region.

Laboratory Work on Soils.

Analyses for soil reaction (pH), total soluble salts, and chloride ion, have been conducted on twenty-four soil samples collected in the Southern Region reconnaissance.

Some 80 samples have been analysed for available phosphate, using the method of Beater. Fifty-four of them were for the Division of Horticulture. Many "quick tests" on farm and home garden samples were conducted.

Analyses of soil samples from the *Warrawidgee 11 Estate Survey* have been continued. Analyses for soil reaction (pH), total soluble salts, and chloride ion have been completed on 264 samples, and the determination of exchangeable cations is in progress.

Soil reaction (pH), total soluble salts, and chloride ion have been determined on 324 samples taken in the course of the *Forest Creek Estate Soil Survey*.

Investigation of methods for the rapid and accurate determination of sodium and potassium ions in soil ion-exchange rotation, by the use of a flame photometer, has been completed. Correction graphs for the presence of sodium, calcium and magnesium in the potassium determination, and also for the presence of potassium, calcium and magnesium in the sodium determination have been constructed. The effect of various acids, alkalies and salts have also been studied.

Many samples from field officers of the Divisions of Plant Industry and Horticulture have been analysed for pH and chloride content. Based on the results, suitable chemical solutions have been prepared for the officers' use in field determinations of soil reaction and salt content of soils.

Soil Survey Advisory Committee.

This Committee met to consider the current activities of the Soil Survey Unit and to allocate project priorities. It gave particular attention to the position as regards the following current soil surveys:—

- (i) *County of Cumberland Soil Survey.*—Preliminary report and maps completed during the year. Laboratory analytical details, including a number of mineralogical aspects, almost completed. Draft of the final report and soil maps, in preparation.
- (ii) *Murray Downs Estate (Swan Hill Survey).*—56,000 acres taken to Stage 2 and 26,000 acres taken to Stage 3 level, surveyed during the year, field work being finished in December, 1954. Work in progress on laboratory analyses from type profiles. Soil map and report to be issued when the latter information is to hand.
- (iii) *Soil Survey of Agricultural Research Institute, Wagga, and Surrounding Areas.*—Preliminary reconnaissance Southern Region completed, including the Wagga Agricultural Experiment Station (and Agricultural Research Institute) areas and the Temora Experiment Farm. Further field work envisaged for the near future.
- (iv) *Billabidgee Soil Survey.*—Three surveyors from Chemist's Branch assisted officers of the C.S.I.R.O. Division of Soils in the field mapping stage during the year.

M.I.A. AGRICULTURAL CHEMIST.

The officer appointed as M.I.A. agricultural chemist has been working in the head office laboratory, Sydney, pending facilities at Yanco Experiment Farm.

Citrus Quality Investigation.—The M.I.A. work has, so far, been confined to investigation of the problem of poor quality in oranges from the M.I.A. The quality under investigation is characterised by thick, rough, puffy skins, low juice content, and unfavourable levels of titratable acid and total soluble solids in the juice. The C.S.I.R.O. Division of Food Preservation, Homebush, the C.S.I.R.O. Irrigation Research Station, Griffith, and the Yanco Experiment Farm are collaborating in this research.

In collaboration it was decided that the main initial project for the Chemist's Branch would be a study of the development of orange fruit on some M.I.A. orchards, along similar lines to a study of Gosford district oranges by officers of the C.S.I.R.O. Division of Food Preservation. The work commenced in December, 1954. The opportunity is being taken also to record the seasonal variations in levels of some of the major nutrients in orange leaves and fruit.

Four blocks of Valencia trees on orchards in the Wamoon and Leeton districts of the M.I.A., covering a range in quality, were chosen with the help of fruit officers. Fruit and leaves are being sampled from each block at intervals of six weeks until the crop matures. The observations include:—

Measurements of growth such as live weight, dry weight, and volume of pulp, peels and whole fruit.

Aspects of quality such as skin thickness, juice content, and sugar and acid content of the juice.

Indices of physiological function such as respiration rate, total nitrogen, protein nitrogen, total and inorganic phosphate.

The levels of the nutrients, nitrogen, phosphorus, and the major cations, in the fruit and leaves.

It is too early to draw conclusions.

Other Projects.—Other work decided on at the initial discussions included:—

(i) Control analyses on phosphate trials on citrus in the field. Samples from trials laid down by Yanco Experiment Farm officers are being analysed.

(ii) A survey of commercial orchards to find correlations between fruit quality and certain factors considered to be of likely importance in this regard.

Analytical Methods Research.—In connection with the work outlined in the foregoing paragraphs a considerable volume of research into analytical methods has been necessary. Suitable procedures have been determined.

PESTICIDES SECTION.

Toxic Residues.—With the advent and popular use of many toxic chemicals as insecticides and fungicides in the fruit growing and other food producing industries, the problem of pesticide residues on food is increasingly important. Investigations in this connection are summarized under the following heads:—

(a) **Lead and Arsenic Residues on Apples.**—It has been found that if recommended spraying programmes for control of codling moth by lead arsenate are followed, the fruit will carry harmful residues. Investigations are being carried out in conjunction with the C.S.I.R.O. to find an inexpensive, efficient method of removing excessive residues of the lead and arsenic from apples.

(b) **DDT Residues in Milk Products.**—It has been shown that when dairy cattle are dipped in DDT dips for cattle tick control, their milk is appreciably DDT contaminated. The concentrations found in milk are not considered hazardous by health authorities but the DDT content of such by-products as cream and butter could well prove excessive. On the far north coast where routine dipping is carried out, most of the milk obtained is processed into butter. Work is proceeding, to determine the hazards occasioned by routine dipping of cattle and to try to predict the hazards likely to be occasioned by an intensive dipping programme, such as in an eradication campaign.

(c) **Mercury Residues on Apples.**—Organic mercurial compounds are now commonly used because of their eradicant fungicidal properties. However, the maximum amount of mercurial residue allowed is nil. Thus, excessive residues are inevitable unless precautionary measures are taken. Investigations are proceeding.

BHC for Grasshopper Control.—Considerable quantities of benzene hexachloride (BHC) were used in the recent campaign against the plague locust. The BHC concentrate was supplied in conformity with the Department's specifications. Several poor batches were tested but most were reasonably satisfactory in terms of the specifications. In view of the experience gained in this campaign, revised specifications have been drawn up to ensure the supply of a suitable product in future campaigns.

BHC for Cattle Tick Control.—Investigations are continuing into the chemical stability of BHC used in dips for the control of the cattle tick. The information gained will assist in the maintenance of cattle dips.

Chlorinated Hydrocarbons, Insecticidal Studies.—An officer of the Chemist's Branch has been seconded to the N.S.W. University of Technology for 12 months to study insecticidal formulations of the chlorinated hydrocarbon type. The object is a fundamental working knowledge of the suspensions and emulsions of chlorinated hydrocarbons which will be used in the forthcoming cattle tick eradication campaign in northern N.S.W.

The studies so far have been concerned with the effects of salts, clays, and other materials on the stability of DDT formulations. In formulations now in use considerable DDT is sometimes deposited on the bottom of the dip as large crystal aggregates which cannot be re-suspended long enough to be of further practical use for cattle dipping. A means of inhibiting this DDT crystal growth is being sought.

STOCK FOODS AND MEDICINES ACT.

Ninety-two samples were taken and analysed in accordance with the provisions of the above Act and four certificates of analysis were supplied to the legal officer for further action.

The analyses revealed that the general standard of foods was satisfactory. The majority of laying mashers, pig meals and calf meals complied with the registered content requirements.

The analyses of foods requiring higher additions of protein concentrates, such as starter and growing mashers for poultry, were less pleasing. The results were variable and indicated in the cases of larger, city manufacturers as well as smaller, country manufacturers, a lack of technical control of production.

Overall results were an improvement on 1953-54.

COMMITTEES.

The Chemist's Branch was represented in the following committees:—

Wheat Advisory Committee, Plant Nutrition Committee, Pest Destroyers Act Committee, Veterinary Medicines Act Committee, and Soil Survey Advisory Committee.

MISCELLANEOUS.

Toxicology.—Information was supplied to the Water Board as to the toxicity of arsenic to horses, in connection with pending litigation.

Meat Meals.—Samples of meat meal from the recently opened Dubbo Abattoirs were analysed for fat and moisture content.

Botanists' Branch.

BOTANIC GARDENS, NATIONAL HERBARIUM AND ALLIED ACTIVITIES.

The Botanic Gardens, Domain, Centennial Park and the grounds of Government House and Admiralty House were maintained in satisfactory condition, relative to the abnormal, high rainfall. Important research work was carried out in the National Herbarium, and the usual botanical and horticultural services were extended to the public and other institutions.

NATIONAL HERBARIUM.

Plant Special New to N.S.W.—The following species were recorded for the first time in N.S.W. Locality of collection is shown. The previously known distribution or country of origin is in parenthesis:—

Carduus nutans, "Musk Thistle", Orange (Europe).

Carex tasmanica, Dalgety (Tasmania).

Cenchrus echinatus, Murwillumbah (Tropical America; and naturalised in Queensland and the Pacific Islands).

Chenopodium rubrum, Macquarie Fields (Europe).

Conringia orientalis, "Hare's Ear", Cudal (Europe and Western Asia; naturalised in Victoria and South Australia).

Croton capitatus, "Hogwort" or "Woolly Croton", Dubbo (U.S.A.).

Cryptostylis hunteriana, West Head, Kuringai Chase (Victoria).

Ecballium elaterium, "Squirting Cucumber", Berrigan (Mediterranean Region; naturalised in Victoria and South Australia).

Erysimum repandum, "Treacle Mustard", Coonabarabran (Mediterranean Region; naturalised in Victoria).

Ottochloa gracillima, Gosford and Murwillumbah (Queensland).

Panicum fasciculatum var. *reticulatum*, Gunnedah (U.S.A.).

Paspalum quadrifarium, North Ryde (South America).

Prostanthera melissifolia, Disaster Bay (Victoria).

Pterostylis fischii, Grose Valley (Southern Victoria).

Rubus roribaccus, a "Dewberry", Sydney District (America).

Avena ludoviciana, Tamworth (probably native to central Asia. Now distributed through south and central Europe and many other parts of the world).

In addition, *Vandenboschia aphlebioides* (Sumatra to Fiji), was recorded for the first time in Australia in the Daintree district, north-eastern Queensland.

Naturalised Plants.—A number of exotic or introduced plants recorded as having become naturalised in N.S.W. included the following species:—

Sorghum verticilliflorum, a grass indigenous to districts from Tropical Africa to Natal, was found to be established in the Lismore area.

Paspalum quadrifarium and *Rubus roribaccus*, though recorded for the first time in N.S.W. were found to be naturalised at North Ryde and in various outer suburbs of Sydney.

Records of Rare Species.—Several rare species were identified:

Cymbidium gomphocarpum, a native orchid, formerly only known from an unpublished description and plate by R. D. Fitzgerald, was found at Bellenden Ker, Queensland.

Avena sterilis, previously only recorded from the Richmond district was found at North Ryde.

Lindsaea cuneata, a rare fern in N.S.W., was recorded from the Minnamurra Falls locality.

Rhysoetochia bifoliata was found at Gresford, having previously been recorded only from the Macpherson Ranges and the Myall lakes.

Extension of Range.—Field observations by our staff and other collectors increased the known range of a number of native species as follow:

Bridelia exaltata, "Brush Ironbark", southwards from the Clarence to near Taree.

Cordylone striata, southwards from Forster to Brunker-ville.

Cryptocarya rigida (formerly *C. patentinervis*), southwards from Williams River to Brunkerville.

Eucalyptus apiculata, northwards from Hilltop-Berrima to King's Tableland.

Eucalyptus goniocalyx, northwards from Nundle-Walcha to north east Guyra.

Eucalyptus malacoxylon as for *E. goniocalyx*.

Eucalyptus perriniana, northwards to Kiandra.

Eucalyptus viridis, "Green Mallee", eastwards to 10 miles west of Scone.

Prasophyllum frenchii, northwards from southern tablelands to Barrington Tops.

Pterostylis truncata, southwards from north coast and tablelands to central tablelands at Glaumire.

Xanthorrhæa macronema southwards from Wyong to Otford.

Poisonous Species.—A possibly poisonous plant was recorded from Berrigan where it had become established over half an acre in a paddock where sheep had died. This was *Ecballium claterium*, "Squirting Cucumber", a native of Mediterranean regions but also naturalised in Victoria and South Australia.

Botanical Exchanges with Other Institutions.—Some 2,673 herbarium specimens were received from thirteen overseas and three Australian institutions, including some valuable Australian collections by Drummond and Cunningham from the British Museum. 490 herbarium specimens were forwarded in exchange to ten overseas institutions, and over 300 specimens were loaned to three overseas institutions and two Australian herbaria for investigation.

Field Collections and Seed Exchanges.—Several major trips were made by the seed and plant collector, including visits to the far south coast (Cape Howe area), the north west (Warrald and Pilliga, and into Queensland), the central tablelands (including Abercrombie Caves), and the far western plains (Broken Hill—Tibooburra). In addition several minor trips were made. A total of 5,828 miles was covered by the collecting van.

As a result over 1,200 plant species were collected for herbarium specimens, and seed supplies were gathered from 150 species.

In continuation of seed exchange 350 samples were forwarded to thirty institutions in Europe, Asia, North and South America and South Africa. In return, 220 samples of seed, of species specially selected for the Sydney Botanic Gardens from thirty-one overseas institutions were received. Some samples of fern spores were also obtained.

Additional Weed Species.—Several exotic species were noted becoming established as potential weeds. The more important of these were:

Avena ludoviciana, an "Oat Grass", already a serious nuisance in Queensland.

Cenchrus echinatus, a "Burr Grass", a nuisance in Queensland, where it is known as Mossman River Grass, and in Pacific Islands.

Croton capitatus, "Hogwort" or "Woolly Croton", a common weed of waste lands and roadsides in North America; where it originated.

Research.—For the projected publication, "The Flora of New South Wales", material has been prepared on the genera *Brachiaria* and *Paspalum* (family Gramineæ), *Barklya*, *Castanospermum* and *Sophora* (family Papilionaceæ) and the *Zannichelliaceæ*. Previously prepared material on seventeen families has been reviewed and organised for final typing.

Investigations on *Calitris*, *Potamogeton*, *Zostera*, the family *Zannichelliaceæ*, the *Dryopteris decomposita* group of ferns in Australia, and allied species in Polynesia, and the *Dryopteris tenera* complex, have been satisfactorily concluded.

The products of critical studies of south-east Australian representatives of the fern families *Polypodiaceæ*, *Grammitidiaceæ*, *Cyatheaceæ*, *Osmundaceæ*, *Davalliaceæ*, *Hymenophyllaceæ* (in part) and *Aspidiaceæ* (in part) have been written up for publication.

Research on the Pteridophytes of the less well known floras of regions to the north of Australia has determined eighty species for the Department of Forests, Lae, New Guinea, and forty species for the South Pacific Commission, New Caledonia.

The orchid *Cymbidium gomphocarpus* R. D. Fitzgerald, has been identified. It has been found to be native to the Bellenden Ker Range, Queensland.

Research is proceeding on many groups, in particular—*Juncus*, *Ranunculus*, *Panicum*, *Poa*, *Eucalyptus* and *Mecodium australe*.

Extensive field observations have been made on numerous species of *Eucalyptus*, *Casuarina* and members of the *Chenopodiaceæ* in various parts of N.S.W., and on Tasmanian ferns near Hobart, Queensland and Launceston.

The following hybrids have been studied: *Eucalyptus goniocalyx* x *E. malacoxylon*, on the eastern slopes of the northern tablelands; *E. ligustrina* x *E. piperita* on the King's Tableland, Wentworth Falls; *E. obliqua* x *E. pauciflora* near Barrington Tops; *E. campanulata* x *E. radiata* on eastern New England; *E. camaldulensis* x *E. largiflorens* (= *E. oxypona*) in the Murray River district; *E. intertexta* x *E. conica* and *Boronia floribunda* x *B. microphylla* at Wentworth Falls.

The following plant groups have been reviewed and rearranged in the light of recent information: *Sterculia* and the allied genera *Scaphium* and *Firmiana*; the Australian species of *Rorippa* (including *Nasturtium*), *Barbarea* and *Cheesemannia*; the exotic and Australian species of *Stellaria*; the naturalised species of *Avena* and *Hordeum*; the exotic collection of the family *Sapindaceæ*; the genus *Trachymene*; the cultivated species of *Cotoneaster*; the fern genus *Coniogramme*.

The genus *Goniophlebium* has been segregated from *polystichum*. The cultivated shrub which has been incorrectly known in New South Wales as *Gamolopsis debilis* has been determined to be *Euryops abrotanifolius*. The grass *Ottochloa gracillima* has been recognised and separated from the collection of *Panicum* where it had been misplaced.

Publications.—Two numbers of the *Contributions from the New South Wales National Herbarium* have been completed and submitted for publication this year. These are vol. 2, No. 4, containing a paper entitled "*Cyatheaceae of Australia*" by M. Tindale, submitted September, 1954; and vol. 2, No. 5, containing a paper entitled "Revision of the Genus *Callitris*" by J. Garden, submitted June, 1955. Page proofs of vol. 2, No. 2, submitted in January, 1953, have been corrected. Galley proofs of vol. 2, No. 3, submitted in August, 1953, have been corrected.

A paper entitled "Studies in Australian Pteridophytes, No. 2" by M. Tindale, has been published in the *Victorian Naturalist*, vol. 71, April, 1955. This contains notes on *Vandenbergia aphlebioides*, *Bolvisia mucronata*, *Dictymia brownii* and *Lycopodium fastigiatum*.

A paper entitled "Notes on the genus *Polystichum* in South-Eastern Australia" by M. Tindale, has been published in *Proc. Linn. Soc. N.S.W.*, vol. 80, parts 1-2, 1955.

The Honorary Custodian, Rev. H. M. R. Rupp, has published a note "Orchid notes from New South Wales and Queensland" in the *Victorian Naturalist*.

Wild Flower and Native Plants Protection Act.—A suggestion by the Department of Local Government, regarding the desirability of publishing a booklet illustrating and describing protected and related species was considered. Some proposals have been drafted and discussed with the Government Printer. Specimens were determined for officers administering the Act.

Professional Visitors.—Many visitors came to the Herbarium to study groups of plants or to discuss botanical matters. These included Professor H. J. Lam, Director of the Rijksherbarium and Professor of Botany at Leiden, Holland; Dr. E. Whitehouse, Southern Methodist University, Dallas, Texas, U.S.A.; Dr. Marie E. Phillips, Botanist, Snowy Mountains, Hydro-Electric Authority; Mr. R. Ornduff, Fullbright Scholar University of Washington, Seattle; Mr. H. B. Singh, Colombo Plan Senior Fellow; Dr. T. V. Desickachary, University of Sangar, India; Miss Caswell, Birmingham University; Mr. U. Kinet, Belgian Congo Research Institute; Mr. J. Hunter, Chief Horticulturist, D.S.I.R., Auckland, New Zealand; Professor Crocker, Botany School, Sydney University; Dr. Evans, Director, The Australian Museum; Dr. Bornemissza, Mr. Gray, Mr. Tracey and Mr. Brook of the C.S.I.R.O.

Other Visitors.—Parties of inspection from the Royal Horticultural Society, the Balmain Teachers' College and the Country Women's Association, and Asian students were conducted through the Herbarium and Gardens.

General.—A specially designed drier was made for the rapid and efficient drying of herbarium specimens. Losses through faulty drying have been very much reduced by it.

Further kodachrome 35 mm. transparencies of native and exotic species have been made, and the Branch now has more than 250 slides which have proved most useful in lectures to staff and outside organisations.

Eighty specimens of rumen contents of animals were examined for the Glenfield Veterinary Research Station in connection with investigations on poison plants.

Field investigations were carried out by members of the staff chiefly in the Upper Hunter, Barrington Tops, Ivanhoe—Wyalong—Hillston and Broken Hill Districts.

BOTANIC GARDENS AND DOMAINS.

These areas were maintained in satisfactory condition despite very unusual conditions. The total rainfall for the year was 74½ inches, almost 30 inches above average. Abnormal grass and weed growth, damage to annuals, maintenance difficulties and interrupted spray programmes for pest and disease control, were natural outcome of the phenomenally wet year. Even so a number of improvements were achieved:—

Improvements—

- The area surrounding the Cunningham Memorial Pond was redesigned and replanted.
- A new bed of native plants was established in the north eastern corner of the Gardens.
- Eighty selected plants were established in the three beds of wind-and-spray resistant species near the seawall in Farm Cove.
- Additional species were added to the new medicinal beds.

- Specimen trees were planted out in lawns in many parts of the Gardens.
- An area adjacent to the large pond was redesigned, and special attention was given to stone-flagging.
- The programme of concrete kerbing of pathways was continued.
- The depot buildings were painted, resulting in fresh and pleasant appearance of the whole area.
- New turf plots were developed to replace the old demonstration area which was in very poor condition.

Royal Visit.—The four trees planted by Her Majesty Queen Elizabeth II and His Royal Highness the Duke of Edinburgh have become established in the Botanic Gardens and Government House grounds. Appropriate bronze plaques and stone surrounds have been erected. Consideration has been given by the State Government to the erection of a suitable memorial at the site of the Royal Landing in the area adjoining Farm Cove.

Glasshouses.—Special displays of *Chrysanthemum*, *Cineraria*, *Schizanthus* and orchid species were set up in the show-house and shade-house.

A complete list of all glasshouse species has been prepared for inclusion in the Botanic Gardens catalogue.

Displays.—Displays were also prepared for the National Art Gallery, the Chrysanthemum Society's Show, and a non-competitive exhibit in the Horticultural Hall at the Sydney Royal Show.

Landscape Gardening Service.—The garden landscaping service had many calls. Dubbo, Glen Innes, Griffith, Lismore and Bingara received special attention, including advice on the sites and plans, and full reports.

Advice and plans were also provided for metropolitan institutions.

New Plan of the Botanic Gardens.—The plan, prepared by the Department of Lands in association with our landscape gardener, has been printed. It has proved very satisfactory.

Staff Losses.—Many staff changes occurred. A disturbing feature was the number of young and promising officers who were attracted elsewhere. It was hoped that such officers would in time fill senior positions in the Gardens' staff. If the trend continued, the future would prove very difficult. On 30th June, 1955, vacancies existed for fourteen officers.

OUTER DOMAIN.

Fig-tree Avenue was resurfaced by the Department of Public Works, and all necessary repairs were carried out.

The areas used for sporting purposes were in heavy demand. It is estimated that, for the six months from March to September, 1954 approximately 17,000 players were accommodated, including:—basket ball 8,300 players; Rugby football, 3,480 players; soccer football, 2,820 players; and schools (football, etc.) 2,400 players.

The number of games played comprised basket ball 593, Rugby football 134 and soccer football 128. In addition the area was used by casual players.

GOVERNMENT HOUSE.

The grounds were maintained in satisfactory condition, and minor improvements were effected.

CENTENNIAL PARK.

A contract was let for the building of three new changing and toilet rooms; and construction commenced. These rooms should do much to relieve the very unsatisfactory accommodation.

Plans were also finalised for new depot buildings. A new water service was made to the rose garden and flower bed lawns, and repairs were effected to the stone wall surrounding the large pond.

The purchase of a fertiliser distributor and a rotor-type grass cutter facilitates maintenance.

The main playing areas were again in heavy demand by sporting bodies. Additional facilities were provided for the Royal Agricultural Society in connection with the Royal Show and an area was provided for the holding of A.B.C. symphony concerts.

DIVISION OF MARKETING AND AGRICULTURAL ECONOMICS.

State Marketing Bureau.

Marketing Boards.—The several producer-controlled Boards functioning under the Marketing of Primary Products Act, 1927-40, are the Egg, Rice, Potato, Navy Bean, Wine Grapes and French Bean Seed Marketing Boards.

The triennial election of producers' representatives to the Navy Bean Board, with headquarters at Guyra, took place early in the year. Preliminary action proceeded towards the election of producers' representatives to the Egg and the Rice Marketing Boards. Each of those elections is scheduled for October, 1955.

Following inter-Departmental agreement to transfer from the Water Conservation and Irrigation Commission to the Department of Agriculture various administrative functions relating to the Dried Fruits Act, the Division conducted the triennial election of four producer representatives to this Board for the three year period commencing 1st March, 1955.

By request the Chief of Division acted also as Returning Officer for the election of State Councillors to the Potato Growers' Association.

Suitable action was taken to fill a vacancy in the French Bean Seed Marketing Board caused by the resignation of one of the two Ministerial nominees.

Marketing of Primary Products Act, Amendments of Regulations.—Regulations in respect of the Potato Marketing Board were amended to provide for eleven in lieu of nine grades of potatoes, and to define in detail the two new grades. Regulations covering the operations of the French Bean Seed Board were amended to reduce the number of grades from seven to five. Amendments to Egg Marketing Regulations provided for an increase in minimum weight for the hen egg grade from 1½ oz. to 1¾ oz.

Wheat Industry Plebiscite.—Further to the Commonwealth-State agreement in June, 1954 to adopt a Wheat Stabilisation Plan to cover the five seasons 1953-54 to 1957-58, the Division was called upon to conduct a plebiscite of New South Wales wheatgrowers in October, 1954. This required the enrolment of 25,257 wheatgrowers. It resulted in an overwhelming affirmative vote of 14,110 in favour, to 914 against.

Honey Industry Plebiscite.—A poll of 2,348 honey producers was held in September, 1954, on the proposal of a Commonwealth Marketing Scheme. The proposal was overwhelmingly defeated, 1,225 votes against, 347 for.

The Chief of Division was Returning Officer for each of those two plebiscites.

Market Reports and Statistics.—The Division continued to fulfil its statutory obligations in regard to the collection, compilation, publication and broadcasting of market information. Market prices and trends, the availability of supplies, and other relevant information, were covered in respect of the livestock auctions at Homebush (cattle, sheep and pigs), the poultry and fish markets, the Sydney fruit and vegetable and flower markets, Alexandria railway goods yard, Sussex Street, and Homebush Abattoirs.

Reports on the grain market, and on cold store stocks of butter, cheese and eggs were published weekly. Cold storage statistics for fruit were published monthly, together with monthly average prices for a wide range of products. A monthly collection of retail stock feed prices was instituted, covering country centres as well as the County of Cumberland. This information supplemented the monthly collection of wholesale stock feed prices. In addition, the daily collection of foodstuff retail prices, including fruit, vegetables, meat and fish, was continued.

The Australian Broadcasting Commission continued the daily national network broadcast of market information supplied by the Division. Similar information was provided by the Division to daily and weekly newspapers and journals through *Daily Market Reports* and *Weekly Marketing Notes*. Each week's trading was summarized in the latter.

The Division dealt with many inquiries on marketing methods, price trends, and suitable markets for placement of produce, and provided information on the optimum period for the marketing of various types of fruit and vegetables. Continued producer interest and confidence in the Division's market information services have been obvious.

The Division continued to record the movements of primary produce by rail and sea, covering intra- and inter-State arrivals on the Sydney markets. Unfortunately, it remained impracticable to obtain satisfactory information on the movement of produce by road.

Crop Reviews and Forecasts.—Surveys were undertaken at selected periods in the development of wheat, oats, maize, broom millet, potato, pome and citrus fruit crops, for reviews of crop conditions and for forecasts of production. The basic information for these reviews and forecasts was provided by the Department's district officers, and by a large number of *honorary crop correspondents* in the various producing districts. The crop reviews and forecasts are used for official purposes,



Subterranean Clover Seed Harvest.

1,100 tons of certified seed resulted from the subterranean clover seed harvest—an increase of 100 per cent. over the 1953-54 production.

The number of farmers seeking to participate in the Pasture Seed Certification Scheme has greatly increased.

(Photo. from Wagga Office.)

but are clearly of value also to the respective industry, the various marketing authorities, the press, and the general public.

The monthly circulation of a broadsheet *The Review of Grass Conditions and the Pastoral Outlook in New South Wales* was continued, for information to the pastoral industry and allied interests. It is based on data from *honorary crop correspondents* and inspectors of stock. The co-operation of forestry officers in the preparation of *The Quarterly Review of Honey Flow Prospects* is acknowledged. This review is issued mainly for the benefit of itinerant, commercial beekeepers.

Attention has been given to new techniques of crop forecasting with a view to simplifying procedure. Modified methods have been used in forecasting maize, broom millet and potato production. It is anticipated that similar innovations will be applied in general during 1955-56.

Meteorological Services.—An officer of the Division acts as departmental representative on the State Climatological Committee of New South Wales and as liaison officer between the Department and the Sydney Weather Bureau. Meteorological advice and data are provided by him for officers of the Department and members of the public, in relation to farming or contemplated farming pursuits. Extensive meteorological records are maintained. These are essential to the Division's crop reviews and crop forecasts. Technical advice was given in respect of purchase of meteorological equipment for location at the Department's colleges and experiment farms. Quarterly rainfall graphs were prepared, as previously, for publication in *The Agricultural Gazette of New South Wales*.

ECONOMICS RESEARCH.

A wide range of research into problems affecting the economics of agriculture, including management problems on individual farms, was executed. As in the past much of it consisted of field surveys. The Division continued to co-operate with the Commonwealth Bureau of Agricultural Economics in important research projects. The results of this joint work have been or will be published, in the first instance, in the Division's *Review of Marketing and Agricultural Economics*. The comprehensiveness of the Division's research programme is illustrated by the following summaries of the more important research projects in hand during 1954-55.

The Adoption of Improved Farm Practices by Wheat Farmers.—This survey was carried out on two groups of wheat farms, one in the north-west and one in the south-west. The aim was to investigate the factors which influence farmers in either adopting or not adopting a particular innovation or innovations in general. The results indicate that:—

- (i) the pattern of adoption of innovations mainly reflects the different skills and attitudes of the farmers concerned, rather than the operation of technological and economic factors;
- (ii) these skills and attitudes are of a general rather than a specific nature, so that the propensity to innovate can largely be identified with enterprise or entrepreneurial ability in general;
- (iii) entrepreneurial ability should not be conceived simply as an inherent capacity; it involves certain attitudes which can be traced to farmers' past experiences—boom and depression experiences in particular.

An important finding was that farmers newly established in a district are more likely to adopt new practices than are farmers who have been long established in the area.

Land Tenure on Dairy Farms on the Far North Coast.—Arising out of a field survey of approximately 80 dairy farms in the red soil ("Big Scrub") area of the Richmond-Tweed district in the previous year, a report was prepared on land tenure arrangements and conditions, and their effects on farm efficiency in that region.

It has often been asserted that non-owner operatorship of farms leads to exploitation but this survey provided no evidence to substantiate that assertion. However, in general, share farmers and tenants were found to be less efficient than owner-operators in terms of production per man and production per cow. This finding is of particular importance, since 40 per cent. of the surveyed farms were operated by persons who did not own the farm.

Survey of the Beef Cattle Industry.—Following the survey of beef cattle raising in north-eastern New South Wales, conducted in collaboration with the Bureau of Agricultural Economics, a further survey, of the beef cattle industry in north-western New South Wales, was completed. A report was

published. In addition, a general report on some economic aspects of the beef cattle industry in New South Wales was published in the Division's *Review of Marketing and Agricultural Economics*.

Surveys of the beef industry in other parts of the State, in collaboration with the Bureau of Agricultural Economics, have been planned. These surveys are in recognition of the undoubted potential for increased beef cattle in New South Wales; a significant potential in view of the relatively satisfactory export market and prospects for beef.

Survey of the Cost Structure of the Dairy Industry.—The Division continued, with the Bureau of Agricultural Economics, this comprehensive Australia-wide survey of the dairy industry. The Bureau of Agricultural Economics has already published for the Commonwealth reports dealing with butter production costs, based on data from this survey. Further reports dealing with the cost structure of the industry and management practices in regions are now being prepared for each State. The Division is active in the preparation of the reports covering New South Wales.

One report, primarily being prepared by the Bureau of Agricultural Economics, with assistance from this Division, will present information on the cost structure of the industry in New South Wales, coupled with information on dairy farm agronomy, herd management, and dairy farmers' attitudes to investment, borrowing, farm development and management problems.

Another report, primarily being prepared by this Division, examines factors which seem to account for income differences among dairy farmers in the Richmond Tweed region of New South Wales.

Each of those two reports is expected to appear during 1955, and will be of value to extension officers and the industry.

Survey of Grazing Properties in the Southern Agricultural Region.—The Regional Advisory Committee, Southern Agricultural Region, Wagga, requested a comprehensive survey of 150 grazing properties in the south-eastern section of the Region. This was completed. The aims were:—

- To assess the potential for further development in the surveyed area,
- To measure the effectiveness of existing extension services in the area, and
- To obtain factual information about property management practices in the area.

Valuable assistance in the field work involved in this survey was provided by the Rural Bank of New South Wales.

An initial report, on livestock management practices, has been published. Work is proceeding on the major objectives with a view to early publication of two reports, respectively dealing with (i) the potential of the area and (ii) extension services in the area. Considerable information on the financial position of graziers was obtained. A report on the financial position of a group of surveyed farmers will be published.

Vegetable Industry Survey in the Murrumbidgee Areas.—The Vegetable Industry Committee set up by the M.I.A. Irrigation Research and Extension Committee requested a farm survey of vegetable growing in the M.I.A. This was done, with particular attention to the industry's relationship to fruit growing.

Stimulated by war-time demand for canned vegetables, the M.I.A. vegetable industry assumed major proportions during the mid-forties. It is still an important industry, particularly in the Mirrool section. The large number of immigrants, farming on leased land, and the growing of vegetables on fruit farms, have raised sociological and agronomic problems which are receiving close attention from the Irrigation Research and Extension Committee. The survey by this Division—the field work now complete—aims to clarify a number of hitherto obscure issues, including:—

- The number of growers in the industry,
- The acreage of vegetables grown;
- The land use techniques, and
- The nationality and the tenure status of vegetable growers.

Classification of Farms by Types for the State Statistician.—The Division has investigated methods of classifying N.S.W. farms by types. This was requested by the State Statistician. A preliminary method, based on the information from land holders to the Statistician in the agricultural and pastoral census, has been devised.

Classification of farms by type is common practice in a number of overseas countries, particularly in Canada and the United States. It would permit a much more refined analysis of rural statistics than is at present possible in Australia. The adoption of an appropriate scheme of farm-type classification in N.S.W. would be of considerable value to research workers in agriculture. It will facilitate more rational design of future farm surveys, and provide considerable information, on a State and a regional basis, which farm surveys cannot provide with economy at present.

Study of Superphosphate Usage and Future Demand.—Superphosphate usage and the likely future demand have been studied. The results suggest that consumption is likely to increase by more than 100 per cent. within eight to ten years. If prices and costs remain near current levels, and seasons are normal, the annual consumption may treble in ten years, but if farm incomes fall below current levels by more than 20 per cent. the demand will probably rise only to 600,000 tons per year compared to the current 300,000 tons.

This study has highlighted the very pressing need for further substantial expansion in the capacity of plants producing superphosphate in this State. That capacity has markedly increased recently, but present expansion plans, so far as they are known, may provide for no more than the increased demand expected by the end of 1956.

Other Research Projects.—Possible methods of subsidising approved farm practices, and the desirability, have been examined and the outcome was published in the *Review of Marketing and Agricultural Economics*. The methodology of demand analysis was studied and a relevant article was published in the *Review*.

Utilization of the Keepit Dam waters has been discussed, preliminary to an investigation. This investigation would be concerned in particular with the types of farming desirable and the likely market for commodities which could be produced under irrigation in the north-west.

Pome fruit industry problems in the Batlow district have been discussed with the Advisory Committee of the Southern Agricultural Region. The possibility of surveys of management practices in the area is under consideration.

ADVISORY, EDUCATIONAL AND EXTENSION.

General.—An important function of the Division is to advise on economic policy affecting agriculture.

The Division is called upon to advise sections of the Department as well as other State Departments and instrumentalities, farmers' organizations, commercial firms, and the press, on statistical and allied information, and their sources, relating to the rural industries. In some circumstances the service of extracting statistical and other information for enquirers has been performed.

The supply-demand position for farm machinery and all basic materials used in the rural industries have been regularly assessed. Quarterly surveys of the supply-demand position of protein animal feedstuffs have been undertaken as a guide in determining export policy for protein feeds.

Officers of the Division have addressed Departmental schools for farmers, meetings organised by the Agricultural Bureau and other farmer groups, professional societies, and other organizations, on aspects of the Division's work and the economics of rural industries.

The Division provides a lecturer in Agricultural Economics at Wagga Agricultural College, and during the latter half of 1954 provided a lecturer at Hawkesbury Agricultural College in the same subject. The Division also examines in Agricultural Economics at Hawkesbury and Wagga Agricultural Colleges.

The Principal Economics Research Officer again acted as Public Service Board tutor in Agricultural Economics and Farm Business Management, for students preparing themselves for examination under Public Service Regulation No. 124.

Colombo Plan Students.—Courses of study and more general instruction in agricultural economics, marketing of farm products, and related subjects, were provided for Colombo Plan students from Indonesia, Vietnam, Pakistan and Ceylon. Several of the students spent long periods with the Division. It is thought that all obtained a very thorough appreciation of Australian agriculture and marketing methods. This must benefit them and the respective country when they return as potential leaders in their various spheres.

Publications.—The Division of Marketing and Agricultural Economics maintained the regular publication of periodicals including the quarterly *Review of Marketing and Agricultural Economics*, the *Weekly Marketing Notes*, the *Monthly Report on Production Trends*, the *monthly Review of Grass Conditions and the Pastoral Outlook in New South Wales*, as well as the various crop reviews and forecasts.

Demand for the booklet *Getting Started in Farming* continued at a high level. A new revised edition has been prepared for processing by the Division of Information and Extension Services. Demand for the Division's *Farm Record Books* continued. Three of the four were reprinted.

Regular contributions were made to the Department's monthly *Agricultural Gazette of N.S.W.* under the title "The Business of Farming".

Representation at Conference and on Committees.—The Chief of Division continued as Departmental representative in the State Nutrition Committee and in the Irrigation Development and Food Production Advisory Committee. He also was co-opted by the Secondary Industries Inter-Departmental Committee. The Principal Economics Research Officer continued as Executive Officer of the State F.A.O. Committee. The Division was also represented in the City Markets Advisory Committee and the State Climatological Consultative Committee.

DIVISION OF INFORMATION AND EXTENSION SERVICES.

The Agricultural and Dairy Industry Extension Grants continued to influence the range and effectiveness of the Division's work.

One outcome is the pool of extension aids now located in sixty country offices of the Department. The equipment includes cine film projectors, 35 mm. cameras, film strip and slide projectors, office-desk and pocket-size slide viewers, tape recorders, public address systems, microphones, batteries, screens and other extension accessories.

The collections of reference books at country offices; the regional publicity officers at Orange, Lismore, Wagga and Goulburn; a cine film library service; cine film production; library photo-copying equipment; and radio disc-recording gear, are also outcome of the Grants.

Staff Development.

There are now 47 positions within the administrative effect of the Division, including eight librarians provided by the Department of Education, and three editorial assistants, one display artist-designer, four regional publicity officers and a technical assistant (photographic aids section) provided by the Commonwealth Grants.

At periods of the year the Division was short of up to 11 officers in the typing and general office-assistance section. In consequence the cine film library service was suspended for 6 months; the library circulation of literature to field officers was curtailed for short periods; and the efficiency of distribution of Departmental publications, in response to 'phoned, postal and counter requests was hindered.

Enquiry Counter and Publications Distributions.

Evidence of the public's continued interest in the information services was provided by the 161,763 requests received in the enquiry counter section (37,346 by 'phone; 43,658 by letter; 80,759 over the counter). The decline from 188,352 in 1953-54 would be due in part to increased distribution of literature at regional and district offices.

Most of the enquiries were satisfied by literature from the range of several hundred titles. Publications issued totalled 965,407.

Editing Section.

Agricultural Gazette of N.S.W.—A further improved format was planned for this 96-page monthly periodical which is free to farmers, but the Printer's office was unable to fulfil the schedule. At the close of the year it seemed that the new style would be postponed for an indeterminate period. Monthly circulation of the *Agricultural Gazette* is confirmed as 30,600.

Circulation of monthly *Poultry Notes*, reprinted from the *Gazette*, was 5,800.

Herd Recorder's Letter.—This bi-monthly booklet was circulated to 2,100 herd-recording farmers and miscellaneous addresses. It has been decided to increase the mailing list

to include all dairy farmers, whether herd-recording or not, because of the widening range of extension contents. In June the dairy produce factory managers throughout the State were invited to forward their respective list of suppliers. A mailing list of near to 20,000 is expected to accumulate. The additional expenditure is to be met by Dairy Industry Extension Grant funds.

Weekly, Press Copy.—This broadsheet of topical press releases was syndicated to 298 newspapers and radio stations, and was forwarded to 670 other addresses including field officers and various institutions. Loan of stereos of blocks used in the *Press Copy* totalled 394.

Ronco-ed, Press Releases.—These releases, the majority from the Minister's office, involved 197 stencils and 44,475 roneos and despatches.

Booklets and Leaflets.—251 items within the Department's range of miscellaneous publications were under editing attention arising from revision prior to reprinting.

Farmer Handbook Volumes.—Writing of the manuscript for the *Weeds Volume* was completed. Editing is proceeding. The writer, a former principal agronomist (pastures) has commenced the *Pastures Volume* for the same series.

Regional Publicity.

The regional publicity officers at Orange and Lismore effected striking increases in field officers' use of mass media—the press and radio in particular.

The Western Region's publicity statistics reveal "179 syndicated releases to the press and radio" and "399 broadcasts by officers within the Region (six stations)." Other activities by the publicity officers included organisation of show exhibits, assistance to Agricultural Bureau branches, overall supervision of extension aids, and help in organising field days and short-term schools. In the Southern Region the publicity officer position was occupied for only a small part of the year, but the Regional Supervisor and field officers sustained essential press and radio services.

Library Services.

Library loans amounted to 18,352 items, compared to 19,021 in the preceding year. The total would have been greater but for short term closures of the service when building activities were proceeding and other periods when the staff shortage was too acute.

Accession of books, periodicals, bulletins, and reports from world-wide sources totalled 11,685 items, compared to 11,238 in the preceding year. Books purchased totalled 289, compared to 278 in 1954-55.

Development of branch libraries at the Agricultural Research Institute, Wagga, and at Yanco Experiment Farm, and of reference book collections at district offices occasioned considerably increased cataloguing. The overtaking of a backlog of work in various head office branch libraries has been facilitated by appointment of two additional library assistants.

Display Artist/Designing Services.

The 1955 Royal Agricultural Society Show exhibit was the major undertaking of this section. A fruit industry theme was developed. In so far as it was concerned with common, fruit tree diseases and pests it was particularly informative for and appreciated by the urban public.

Other displays, in which the display artists/designers assisted field officers, included Wagga, Orange, Bathurst, Bombala, Bega, Byron Bay, Mullumbimby, Griffith, Leeton, Tumut, and Clarendon.

The artists also assisted the editing staff by photograph retouchings, page headings, drawings, cartoons, page layouts, and cover designs.

Lecture aids were drafted and/or designed, and art-work completed, for officers of the various divisions. Title and reading frames for cine films were prepared for the photographic aids section.

Miscellaneous work included design and specifications for tape-recorder despatch boxes, sponge rubber lined; servicing of automatic display aids such as propomats and projectors; crating and despatching displays aids to country centres; ticket and sign-writing for field days and demonstrations. Whenever practicable the ticket and signwriting were requisitioned as Prisons Department work.

Photographic Aids Services—Cine and Still.

Field Officers' 35 mm. Photography.—The Photographic Aids Section examined and returned to field offices, with tutorial comment, 4,720 colour slides and 8,130 black and white slides. The figures represent an 82 per cent. increase in colour and 27 per cent. increase in black and white, compared to the previous year's figures.

Every cassette of exposed 35 mm. black and white film received from a field office requires an identification marking of the film by the photographic aids section and then a requisitioning of processing through the Government Printer's Office and a sub-contractor. The processed negatives and prints (35 mm. diapositives for projection) are channelled back from the sub-contractor through the Government Printer's Office to this Division, and thence the diapositives are sent to the field office concerned—with tutorial comments appended to every frame that warrants comment. The negatives, and a duplicate log-sheet for each cassette of film are retained in the photographic aids section.

Similarly, every 35 mm. kodachrome cassette is handled by the Division, except that Kodak Pty. Ltd. replaces the Government Printer and sub-contractor in the processing channel.

Since there are some 70 x 35 mm. cameras and, in many cases, several officers using each camera, these procedures consume a major portion of the photographic aids section's time.

On visits to country offices the photographic aids officer accepted all opportunities to advise field officers on the use of the 35 mm. cameras and accessory visual education aids. In general, the photographic technique and the extension usefulness apparent in the field officers' camera and projector activities have markedly improved.

General Photographic Activities.—The catalogued photographic collection has expanded by the addition of 756 prints, mainly selected from field officers' negatives.

Some 2,765 prints were supplied mainly to editing officers for use in publications and to subject-matter specialists for use in reports and records. External requests for illustrated material have increased. Advertising agents and journal editors have been in the majority.

For the "Weeds Volume" in the Farmers Handbook series 35 weed photographs were taken. Forty enlargements, of various subjects, were arranged for use in show exhibits. Numerous sets of photographs were taken and/or collated for use by subject-matter specialists as lecture aids or in publications, e.g. a series on vegetable packing bags, a series on fruit packing, a series on apple varieties, a series on plant nutrition, a series on maize and sorghum seed heads and so on.

16 mm. Film Production.—The Division completed a film "Schools for Farmers" (600 feet, sound, colour) featuring Hawkesbury College vocational activities, and "Herd Improvement" (400 feet, silent, colour) for Division of Dairying. The photography and editing of a further colour film, "Establishing Irrigated Pastures", have been completed in collaboration with field officers in the M.I.A. and Murray River districts.

Contract production of a film "Meat for Market" was organised by this Division. Division of Plant Industry has been assisted in scripting "Skeleton Weed" and "Serrated Tussock", two films for which a production contract has been arranged. Production of "Pastures in Southern Australia" by the C.S.I.R.O. film unit has been assisted by this Division.

16 mm. Film Library Service.—This service was suspended from November, 1954, until May, 1955, because of staff vacancies and changes. In consequence the number of programmes despatched dropped to 138, as against 283 in the preceding year. Meanwhile, the number of film titles in the library increased from 149 to 174.

For film evaluations, 24 groups were arranged. These were comprised of appropriate Departmental officers. They determined whether a particular film should be acquired and/or the conditions, if any, which should apply to the inclusion of a particular technical film in programmes collated by the Division for rural audiences, e.g. whether a veterinary officer, or a livestock officer, etc., should be present when the film was screened.

Visual Education Aids Equipment in the Field.—The number of 16 mm. sound-on-film projectors at field offices has increased from 21 to 38. A further distribution of 35 mm. film strip/slide projectors increased that total from 58 to 81 but a number of obsolete units require withdrawal. Office desk slide-viewers at district and experiment farm offices increased from 49 to 63.



Beef Breeder Potentials.

In the 3rd Beef Breeder Competition conducted by the Agricultural Bureau, the Rural Bank, and the Division of Animal Industry, the field days associated with district and State championship judgments increased mixed farmers' interest in quality beef.

Radio in Extension Service.

The extension officer (radio) made 31 visits, including repeats, to towns where a tape-recorder is located with field officers to facilitate field acquisition of material for use in local radio sessions. He has the responsibility of improving officers' technique in relation to radio as an extension aid. Tape recorders are located in 22 towns.

His visits included Murwillumbah, Grafton, Armidale, Gunnedah, Wagga, Deniliquin, Moss Vale, Parkes, Lismore, Inverell, Tamworth, Young, Albury, Dubbo, Kempsey, Orange, Queanbeyan, Kiama, Mudgee, Bega, Goulburn, Maitland.

Nine circular letters were despatched to field officers, proffering advice on the operation and maintenance of tape-recorders and accessories.

Towns where field officers now regularly participate or their material is regularly used in farm radio sessions are Orange (2CR and 2GZ), Wagga (2CO and 2WG), Griffith (2RG), Mudgee (2MG), Kiama (2WL, Wollongong), Grafton (2NR and 2GF), Armidale (2AD), Tamworth (2TM) and 2NU), Dubbo (2DU), Bathurst (2BS), and Maitland (2NA, Newcastle)—15 stations.

Towns where the field officers and/or their material are used in farm radio sessions, but not regularly, are Murwillumbah (2MW), Lismore (2LM), Inverell (2NZ), Gunnedah (2MO), Young (2LF), Albury (2AY), Deniliquin (2QN), Bega (2BE), Goulburn (2GN), Taree (2RE), Parkes (2PK), Kempsey (2KM), and Canberra (2CA)—13 stations.

One hundred and twenty broadcast scripts were received from field officers. It has not been possible as yet for the extension officer (radio) to undertake regular tutorial correspondence arising from individual officers' scripts but some such correspondence has occurred. In any case the trend is towards "ad-lib" broadcasts or recordings, using, at most, brief notes to support the extempore conversational style more appropriate for radio presentation of extension matter.

The extent to which the aforementioned 120 broadcast scripts fall short of measuring the Department's radio usage is indicated by the statistics from the publicity officer in Western Region. He reports that six radio stations in the Western Region are using field officers' material, and that officers in that Region were responsible for 399 broadcasts, including 246 recordings.

At head office, using tape and disc recording equipment, seven recordings were made of talks by the Acting Minister, for replay by 2MO Gunnedah and other north-western stations. Eight recordings were made for the women's extension service.

Public Address Systems located at district offices, and at some of the Experiment Farms and Research Stations, to improve the effectiveness of field day sessions, increased from 34 to 47 during the year. The extension officer (radio) in the course of his itineraries tutored field officers in the maintenance and use of this equipment. Four lapel-microphone units sent out on trial were of special interest because of field demonstrators' increased effectiveness when their hands had to be free for demonstrational activity.

The Agricultural Bureau of New South Wales.

Active branches, district councils and divisional councils totalled 207. This is about the norm.

A statistical picture of the contributions of the Agricultural Bureau to extension service is difficult to acquire. Most of the branches met at monthly intervals, typically for lectures, discussions, films, debates, competitions, demonstrations, tours, and field days. The approximate total of field days organised by Bureau branches was 300, a major contribution to the Department's extension services.

Fourteen of the 19 Divisions were represented in the State Advisory Council, and there were also two women councillors. Six of the Bureau Divisions each promoted a convention and two others each promoted a major field day concerned with farm mechanisation. The attendances ranged from 150 to 400 at the conventions. One of the field days (Tamworth) attracted 1,200.

The State Advisory Council met on four occasions. It dealt with many branch representations, passing appropriate industry items to the Council of New South Wales Primary Producers' Associations. The 30th State Congress, 3 days' duration, at Hawkesbury College in July, 1943, theme, "As ye sow . . .", was attended by 30 delegates and visitors, with more than 200 in residence.

The Bureau conducted in collaboration with the Rural Bank of New South Wales and the Division of Animal Industry, a 3rd Annual Beef Breeder Competition. In addition to 128 entries, the competition gave rise to many field days associated with district and State judgments and consolidated a place in the beef industry extension service.

The Agricultural Bureau Scholarship at Hawkesbury College was continued, with value increased from £96 to £110 per annum. A five guinea trophy was awarded by the Bureau for the maize growing championship of the Junior Farmer Clubs.

Honorary life membership of the Agricultural Bureau of New South Wales was conferred on the retiring Principal of Hawkesbury College, Mr. E. A. Southec.

Women's Extension Service.

In addition to organising the availability of men and women specialists from other institutions for women's sessions at Bureau conventions, branch meetings, and field days, the senior extension officer (women's service) personally talked and/or demonstrated at 23 Bureau branch meetings, two field days, and eight Bureau Divisional Conventions.

Twenty-eight articles on women's topics were prepared by her for the weekly *Press Copy*. Press clippings revealed them to be among the most widely used Departmental press releases. Two A.B.C. broadcasts, and four rural "B" Class broadcasts were made by the officer, whilst eight topics were recorded on disc records in the Division for loan to field officers for use in their local radio sessions.

Close liaison was effected with the Bush Nursing Association, the Country Women's Association and C.W.A. Handicrafts Committee, and the Junior Farmer Clubs of New South Wales.

The officer also partook of two courses, for professional leaders, promoted by the Sydney University Department of Social Studies.

Rural Homemaker School.

A five days' course, in residence at the Sydney University Women's College, was organised and conducted by the senior extension officer (women's service). Thirty-four rural women attended.

The course was designed to develop the women as potential, voluntary demonstrators in their home locality, as well as to advance their personal homemaking skills and crafts.

Technical College authorities and specialists from commercial institutions co-operated with the Division to make a success of this school.

Extension Method Training.

The Division organised and provided the tutorial service for two Extension Method Schools. One was of four days duration for 23 x 1st Year students at Wagga Agricultural College. The other was of six days for 36 x 2nd Year students of the Sydney University School of Agriculture. Each of those courses was residential.

An Extension Method course of 12 x 1 hour sessions was provided for 3rd and 4th Year students in the Sheep and Wool department of the New South Wales University of Technology.

Field officers of the Department of Agriculture, candidates for the Public Service Board Regulation 124 Examination (Higher Grades Examination) were examined in Extension Method.

Rural Leadership Schools.

Two rural leadership/office-bearer training schools were conducted for members of Agricultural Bureau branches. Members of Country Women's Association branches and some senior members of Junior Farmer Clubs were also in the attendance.

One of the schools, attended by 35 men and women, for five days, was held at Hawkesbury Agricultural College in the winter vacation. The other, attended by 35 men and women from Western Region localities, for five days, was held at Wolaroi College, Orange, in the summer vacation.

The Division also extended tutorial assistance to three Junior Farmer Club leadership schools (Evans Head, Black Head, and Bathurst) organised by Junior Farmer Club district supervisors.

Miscellaneous.

Mr. J. N. Potter, B.Sc. Agr., assistant organiser, Agricultural Bureau, is overseas, for eighteen months from 2nd December, 1954. He is experiencing extension work in the National Agricultural Advisory Service, British Ministry of Agriculture and Fisheries, and stationed at a field office near Bristol. Mr. Potter is paying particular attention to audio and visual education aids, and anticipates an opportunity late in 1955 to acquire B.B.C. experience of television as an extension aid.

The senior extension officer (women's service) represented the Agricultural Bureau in the New South Wales Bush Nursing Association.

The organiser, Agricultural Bureau, represented the Bureau in the Advisory Council of New South Wales Junior Farmer Clubs, the Rural Education Committee of the New South Wales Primary Producers' Union, and the Milk Zone Dairy Farm Advisory Committee.

The editor of publications continued for the Australian Broadcasting Commission the fortnightly, Sunday morning session—"Roadside Mail Box".

The Chief of Division represented the Department in the New South Wales Film Council, and the Agricultural Bureau in the New South Wales Advisory Board of Adult Education.

REGIONAL EXTENSION SERVICES.

Four Agricultural Regions.

In furtherance of the policy of development of Agricultural Regions and thereby the decentralisation of administration of extension and allied services, under Regional Supervisors, the fourth Region has now been launched. This is the South Coast and Tablelands Region, headquarters Goulburn, inaugurated on 14th April, 1955.

The earlier established Regions were Southern (headquarters Wagga, 3rd February, 1953; Far North Coast (Lismore), 20th May, 1953; and Western (Orange), 10th December, 1953.

Geographic Extent of the Regions.

Of the 133 Shires in New South Wales, 68 are contained by the four Agricultural Regions so far defined by the Department's needs and resources; and 34,391 (49 per cent.) of the 70,779 agricultural holdings are within those 68 Shires.

Shires and Holdings in the Regions.

In N. S. W.	In Regions.				Total.
	Southern.	Far North Coast.	Western.	South Coast and Table- lands.	
No. of Shires (133) ...	16	15	19	18	68
No. of Agricultural Holdings (70,779) ...	7,676	11,240	8,188	7,287	34,391

PERSONNEL IN REGIONS—NUMERICAL STRENGTH.

Of the 259 Department of Agriculture officers stationed in country districts for extension and allied services, excluding veterinary personnel, 150 (58 per cent.) are stationed within the four Regions.

**Field Personnel in Regions.*

Type of Officer.	Department as Whole (In Rural Areas).	In Regions.				
		Southern.	Far North Coast.	Western.	South Coast and Tablelands.	Total.
Regional Supervisors	4	1	1	1	1	4
Agronomists	32	6	4	3	4	17
Seed Certification Officers	6	2	...	...	2	4
Dairy Officers	31	2	13	2	3	20
Dairy Herd Organisers	9	1	3	...	2	6
Dairy Herd Recorders	75	7	23	1	17	48
Herd Survey Officers	1	...	...	...	1	1
Livestock Officers (Sheep and Wool)	13	2	...	2	1	5
Livestock Officers (Pigs)	4	1	1	1	...	3
Livestock Officers (Poultry)	3	1	...	...	...	1
Livestock Officers (Bees)	2	1	...	...	...	1
Fruit Officers	16	2	2	1	...	5
Fruit Inspectors	32	4	9	3	2	18
Publicity Officers	4	1	1	1	1	4
Dairy Grant Organisers	4	1	1	...	...	2
Entomologists	4	...	1	1	...	2
Plant Pathologists	3	...	1	...	...	1
Field Assistants	15	1	3	1	2	7
Mechanisation Unit Demonstrators	1	1	...	...	...	1
Totals	259	34	63	17	36	150

* Experiment Farm, Research Station and Veterinary Personnel are not included.

That tabulation does not include office staff. There are twenty-eight offices within the Regions, and thirty-five shorthand writers, typists, office assistants.

REGIONAL OFFICES—ACCOMMODATION.

The establishment of each Regional headquarters office has been attended by an accommodation problem—space and facilities for the respective Regional Supervisor, publicity officer, field assistants and office assistants.

For Wagga, plans have been finalised for a large office block which will accommodate officers of the Departments of Agriculture and Education.

At Lismore, where the officers are in the Department of Public Works building, four additional rooms have been constructed. Three of these are available to the Regional staff, and the accommodation problem has eased.

In Orange the position is most acute, but a plan is under the attention of Public Works Department for construction of four additional rooms in the Lands Department building where the Regional staff are located.

The Goulburn staff are very well accommodated, in a modern suite of offices in the newly constructed Mulwaree Shire Council Chambers.

STAFF DECENTRALISATION WITHIN EACH REGION.

The policy of decentralising staff within each Region has been actively pursued. This is illustrated by the dairy services within Far North Coast Region. Formerly, the dairy offices were Lismore, Byron Bay and Coff's Harbour, each of those three being staffed by a district dairy officer and other dairy officers. Since the advent of the Regional organisation, dairy officers are stationed away also at Murwillumbah, Kyogle, Casino, Grafton and Macksville. The gains include a more direct local service to farmers and reduced overall costs of travelling.

District Offices, Southern Region.—District officers in the Southern Region are stationed at Wagga (regional headquarters), Albury, Cootamundra, Young, Tumut, Junee, and Batlow.

District Offices, Far North Coast Region.—District officers in this Region are stationed at Lismore (regional headquarters), Murwillumbah, Tweed Heads, Mullumbimby, Byron Bay, Ballina, Kyogle, Casino, Grafton, Coff's Harbour, and Macksville.

District Offices, Western Region.—District officers in this Region are stationed at Orange (regional headquarters), Mudgee, Dubbo Bathurst and Blayney.

District Offices, South Coast and Tablelands Region.—District officers in this Region are stationed at Goulburn (regional headquarters), Queanbeyan, Bega, Kiama, Crookwell, and Moss Vale.

REGIONAL ADVISORY COMMITTEES.

An Advisory Committee is functioning in each Region except South Coast and Tablelands, where there will be a committee in the near future.

The Advisory Committees comprise, respectively, a chairman (the Regional Supervisor), six primary producers, and a citizen from the Regional headquarters city.

Quarterly meetings of the Advisory Committees have been held, and their discussions and recommendations have been of interest to the Department in general and of guidance value to the Regional staff in particular.

Matters raised, and in respect of which further action has been taken or is proceeding, includes:—Bulk handling of superphosphate; commercial mixing of insecticides with superphosphate; expansion of malting barley production; agricultural (economic and soil) surveys of particular areas; the wisdom or otherwise of advising increased plantings of particular fruit, vegetable, field crops; ways and means of establishing further artificial insemination centres; the need of specialised animal nutrition research; and producer assistance to the Department of Agriculture in establishing sub-stations for research.

STAFF CONFERENCES WITHIN THE REGIONS.

Each field officer, irrespective of whether he is an agronomist, a fruit officer, a dairy officer, a livestock officer—as the case may be, in terms of subject matter specialties, is required to advise on *all* agricultural matters to the extent of his personal competence. To broaden the competency of officers, staff conferences have been held within each Region. Chiefs of Divisions and heads of specialised branches of the Department, their subject-matter specialists, and the more experienced officers ("special advisory officers") within the respective Region, have accepted these conferences as opportunities to advance the knowledge of regional staff in general.

REGIONAL PUBLICITY OFFICERS.

The establishment of a specialist publicity officer position in each Region has been possible, as an Agricultural Extension Grant project. The publicity officers are in effect decentralised staff of the Division of Information and Extension Services.

An indication of their marked impact on press and radio services, in particular, within the Regions has been given in the report of that Division. In addition to their personal work on press and radio "copy", the material of which has been

provided by the technical field officers, the publicity officers have given valuable training to their field colleagues in the preparation of press and radio matter.

They are increasingly effective also in assistance to branches of the Agricultural Bureau of N.S.W., the voluntary organisation of farm people—sponsored by the Department for group extension purposes.

At the time of this Report the Southern Region's publicity officer position is vacant. The Southern Regional Supervisor and field staff have, however, maintained during the period of vacancy a worthy press and radio extension service.

Highlights in this Region have included:—

Activities—Southern Region.

The development of a Mobile Mechanisation Unit, with a demonstrator in charge.

An economic survey of part of the Region, relative to production potential and to the effectiveness of existing extension services.

The striking increase in the subterranean clover seed industry, necessitating the appointment of a second, pasture seeds certification officer; and

Visits by particular officers to relevant parts of Victoria and other parts of N.S.W. to broaden their experience.

Mobile Mechanisation Unit.—The Agricultural Extension Grant made possible this Unit and the appointment of a demonstrator, late in 1954. Six weeks of exploratory activity, including publicity as to the presence and capabilities of the Unit, were followed by some months of practical demonstrations, lectures, and film evenings to groups of farmers. The farming communities have reacted very positively towards this unit.

Regional Surveys.—The Southern Advisory Committee requested, as a basis for their future advice, a survey of production potentials and trends, and the effect of existing extension services thereon.

The Survey was undertaken by the Division of Marketing and Agricultural Economics, officers of which Division were assisted by two Rural Bank officers and some of the regional staff.

A first report confirms previously held views on the necessity to "shift the emphasis" of extension service in some respects and to concentrate for periods on particular essentials.

Minor surveys of pome fruit industry at Batlow and the prune industry at Young have been conducted by the respective district fruit officers.

The Soil Survey unit of the Chemist's Branch, Division of Science Services, is also engaged in surveys of parts of the Region in which the Agricultural Research Institute, Wagga, has a special interest.

Extension Officers' Training.—Certain of the Southern Regional dairy officers and agronomists visited Gippsland, Victoria, to observe dairy production and pasture management practices; a poultry officer visited Werribee, Victoria, to observe poultry production and research in that area; and the senior livestock officer (pigs) inspected pig meat production, slaughtering and marketing in the County of Cumberland, N.S.W.

Subterranean Clover Seed Industry.—This has grown to such proportions in the Southern Region that it was essential to appoint a second, pasture seeds certification officer. Over 16,000 acres were inspected, more than twice the previous year's acreage, giving rise to 1,100 tons of seed. The latter is more than $2\frac{1}{2}$ times the quantity harvested in the previous year.

Collaboration with Agricultural Research Institute, Wagga.—The regional agronomists are in close liaison with the Director of the Research Institute, particularly in respect to cereal fertiliser and variety trials, and regional recommendations thereon, and the production, distribution and utilisation of the Department's cereal seed.

Field Wheat Crop Competition Changes.—Regional staff and Advisory Committee were responsible for changes in the N.S.W. Royal Agricultural Society's schedule for this competition. The changes are calculated to stimulate farmers' greater interest in growing higher quality wheats and in improving soil fertility.

Co-operation With Farmers' Organisations.—This has been a feature of the Regional staff's work. Numerous farmer organisations are concerned. An illustration of the co-operation is provided by the assistance given to the Farmers' and Settlers' Association of N.S.W. in organising and conducting

a Farm Machinery Field Day (attendance 2,000) and an associated lecture evening. Two new branches of the Agricultural Bureau of N.S.W. were also organised in the Region.

Field Days.—The major field day has been reported in the preceding paragraph, but many other minor field days—at locality level—were conducted by field staff in association with branches of farmer organisations.

Show Exhibit.—A major show exhibit was organised for the annual show at Wagga, "Water Harvesting" and pasture management were the themes expressed.

Press and Radio.—A weekly "Question-Box" radio session was inaugurated with the Australian Broadcasting Commission's 2CO. A weekly session with "B" class station 2WG (Wagga) was also established. Regular press releases were syndicated to appropriate newspapers. A number of local "leaflets" were photographed for mass distribution.

Activities—Far North Coast Region.

Some of the highlight activities of extension service in this Region have been as follow.

Small-area Pasture Demonstrations.—Thirty such demonstrations were in operation this year, and thirty-four additional have been programmed for the coming year. These are financed by Dairy Industry Extension Grant funds. They are contributing to a widespread quickening of interest in pasture improvement and management. In the Kyogle district, the agronomist reports some 4,000 more acres of improved pasture this year.

An important aspect of the demonstrations was the introduction of sod-seeding machinery, as a means of establishing clover in the natural pasture.

Field days in association with the demonstration pasture projects have featured the sod-seeding procedure.

Field Days.—Thirty-five field days were conducted in the Region, concerned with pasture improvement, tropical fruits production and vegetable production. Major fruit industry field days were conducted at Durambah Demonstration Plot and at Coff's Harbour in association with the Banana Growers' Federation.

The small-group type of field day, at locality level, is favoured by the Regional staff. It has shown signs of becoming a major feature of extension group activities in the Region, particularly within the structure of the Agricultural Bureau organisation in the Far North Coast.

Dairy Produce, Quality Drive.—A conference of dairy officers in the Region planned a drive with the object of general improvement in quality of dairy produce. Subsequently the staff have concentrated on instruction towards quality production on the farms and by the dairy factories. Further concentration of staff will be necessary to restore the general standard of quality to pre-war level, but already the drive has achieved higher quality butter production.

A Richmond processing company won the premier Butter Competitions at the N.S.W. Royal Agricultural Society's Exhibition (1955). Far North Coast factories recently have been successful also in competitions associated with the Dairy Factory Managers' and Secretaries' Conference.

The quality drive is receiving the full support of dairy factory executives within the Region.

Stem Gall Fly Project, for Crofton Weed Control.—The district officers have kept this project under observation. Their evidence is that the stem gall fly is breeding over a wide area of the Region, and that in Tweed Shire alone some 18,000 acres of Crofton weed are infested. The official releases of the parasite were made 18 months ago in the shires of Tweed, Byron, Kyogle, Terania and Tintenbar.

Pasture Research-Extension Liaison.—Close liaison has been maintained between the extension officers of the Far North Coast Region and the research workers of the Sydney University Faculty of Agriculture. A conference of the University research workers and the district agronomists agreed upon a programme of advice to farmers, in respect of sod-seeding of subterranean clover, pending the results of further research work becoming available.

Pig-meat Quality Drive.—The principal bacon factories at Byron Bay and Lismore, acting on advice by the Regional specialist for this industry, are now offering a premium for better quality bacon. The object is to eliminate the over-fat pig. A good response by pig raisers is evident in the steady increase of premium quality pigs since the inception

of this extension aid. When it was introduced only 30 per cent. of pigs on consignment were paid for at premium rates but at the beginning of the ninth month 68 per cent. of the carcasses received were premium quality.

Press and Radio.—A steady flow of press statements was maintained and was well used by metropolitan, rural press as well as newspapers and radio stations in the Region. Sampling has indicated that 90 per cent. of the material released is used by the press and radio.

Radio contributions have been maintained throughout the Region. Stations concerned with the broadcasts are the "B" class stations 2LM (Lismore), 2MW (Murwillumbah), 2GF (Grafton) and the A.B.C. station 2NR (Grafton).

Co-operation with Farmer Organisations.—The Banana Growers' Federation and Department of Agriculture co-operation in this Region, referred to in the report of the Division of Horticulture, is an outstanding illustration. Some £32,000 p.a. is contributed by the banana industry to bunchy-top eradication activities alone. Earlier in the report of this Far North Coast Region's activities there are references also to the co-operation with dairy produce and bacon factories, representing producer and proprietary interests, to achieve quality production.

Agricultural Bureau office-bearers and the regional staff are co-operating to enhance the development of this extension group organisation. Two new Bureau branches were organised in recent months, and others are pending.

Activities—Western Region.

Some of the highlight activities in this Region were as follow:—

Flood Relief.—In the introductory sections of this Report, under "Agricultural Regions", reference was made to the contributions made by regional organisation of fodder supplies, including a fodder air-lift, to western areas afflicted by the February, 1955, floods. With R.A.A.F. co-operation some 55 flights for fodder drops were made, in addition to 20 reconnaissance flights. In all 4,182 bales (105 tons) of fodder were strategically dropped in the area bounded by Dubbo, Dandeloo, Nyngan, Brewarrina and Connamble. Some thousands of sheep and cattle were thereby saved. Regional staff acted as observers and advisers to the R.A.A.F. pilots.

Apart from those emergency relief measures, the regional staff in due course were responsible for approximately 100 property inspections arising out of applications for flood relief.

Rural Leadership School.—The Regional staff collaborated with Mitchell Division of the Agricultural Bureau of N.S.W. to provide a 5 days' leadership school, held at Wolaroi College, Orange, in January, 1955. The school is expected to pay worthwhile dividends in terms of even more effective extension group activities, at locality level, in this Region.

Show Exhibits.—Major displays were promoted at the Bathurst and Orange Shows. These have advanced the farm people's knowledge of the agricultural extension services available to them in the Region. In addition a campaign against fruit fly has been launched, aided by a special fruit fly exhibit which is being shown in each of several western towns.

Field Days.—The number of field days is known to have exceeded 30, and 20 of these were directly organised by Regional staff. At the Annual Machinery Field Day, Orange, an Agricultural Information Centre was staged by the Regional officer and approximately 1,000 Departmental publications were issued there in response to requests.

Press and Radio.—Regular broadcasts have been provided through six radio stations in the Region and one outside it. The stations are 2GZ (Orange), 2PK (Parkes), 2DU (Dubbo), 2MG (Mudgee), 2BS (Bathurst), 2LT (Young), and the A.B.C. station 2CR. In the case of 2GZ at least 3 broadcasts per week have been serviced by the Regional staff. In all, 399 broadcasts were made.

Weekly notes, comprising short items of topical interest, are made available regularly to Orange, Bathurst and Blayney newspapers and less regularly, depending on the contents, to others. In all, however, 29 newspapers in the Region, five metropolitan rural papers and six other papers outside the Region have received press statements from the western office. The total of press articles issued was 179.

Co-operation with Farmer Organisations.—The activity of Agricultural Bureau branches has increased with Regional assistance. Four new Bureau branches have been formed. The Mitchell Division and Macquarie Division of the Bureau were materially aided in the organisation of their Annual Convention programmes, though the Macquarie Convention was in due course not held, because of the floods.



Emergency, Flood Relief.

A fodder air-lift by the R.A.A.F. in collaboration with the Western Regional Office of the Department was responsible for more than 4,000 bales of hay being dropped in flood-affected Western districts. Thousands of sheep and cattle were thereby saved. Agricultural officers flew with the R.A.A.F. crews to direct strategic dropping.

Farmer organisations in general have been assisted by talks, film evenings, loan of public address systems, and by publicity for group activities pending.

Serrated Tussock, Control Campaign.—Of the 33 Agricultural Extension Grant demonstrations in the Western Region, 18 are concerned with control of serrated tussock. A further 20 such demonstrations have been suggested. A number of field days have been held in association with the established demonstrations.

Pastures Sown with Wheat.—Ten of the Agricultural Extension Grant demonstrations in this Region are in furtherance of pasture sowings with wheat.

Pasture Improvement Momentum.—To March, 1954, the Government Statistician's figures reported 630,000 acres of improved pasture in the Region, and district agronomists' observations on the 1954 and 1955 sowing operations indicate that the acreage would now exceed 900,000.

Activities—South Coast and Tablelands Region.

This Region is little more than two months established at the time of this Report. The Regional Supervisor has been concerned mainly with the opening of new headquarters, the development of a basis for expansion in the fields of press and radio service, and the fostering of close liaison with producers as organised groups and as individuals.

The Region comprises 12,953,508 acres, of which some 60 per cent. is recognised as agricultural land.

Pasture improvement is the greatest single trend within the Region in recent times. Statistics show that in 1951 there were 560,000 acres under improved pasture and that by 1954 there were 880,000 such acres (80 per cent. increase).

Further increase of the improved pasture acreage is prominent in the Regional staff's plans. The greatest increases have occurred in the tableland Shires. The staff plan to achieve comparable increases in coastal Shires.

M.I.A. AGRICULTURAL SERVICE.

This Service and the Irrigation Research and Extension Committee were in the nature of an experiment in the decentralised organisation and administration of services for the farmer. The original proposal was for a seven-year period which ended in September, 1954—when the Minister for Agriculture considered that the project should be maintained for a further period of two years.

Irrigation Research and Extension Committee (I.R.E.C.).—The I.R.E.C. is, as clearly as ever before, a strong and useful instrument, skilfully directed by Mr. V. C. Williams of Griffith. It is widely recognised as a focal point of M.I.A. agriculture.

Because of the periodical reviews of the agricultural scene by the M.I.A. Agricultural Service, the Water Conservation and Irrigation Commission, the District Council of Extension Groups, and other bodies, the I.R.E.C. is under continuous pressure—either advising on action or policy or undertaking urgent actions. At the time of this report the rice industry and the vegetable industry are under survey and the role of pastures in the M.I.A. farming scene may also be under survey shortly.

Organiser's Overseas Tour.—The M.I.A. Agricultural Organiser visited U.S.A., Canada, England, Italy, Pakistan, India, Ceylon, Malaya, Sarawak, and Indonesia late in 1954 in the course of four months overseas. Impressions of the tour, illustrated by selections from 400 colour slides taken in the various countries, have been subject of some 20 formal addresses since the Organiser's return.

A better contact with Italian-origin farmers is suggested as a result of his visit to their home territories. An improved service for Colombo Plan Fellows who visit the M.I.A. may also arise because of his contacts with their home countries.

Visitors.—The numbers and types of visitors to the M.I.A. and for whom the Service accepted some responsibility were much the same as for some years past. Statistics show that 160 parties ("parties" ranging from individuals to groups of 60) visited. In the 160 were 16 "parties" arising from the Colombo Plan, U.N.E.S.C.O., F.A.O., Fulbright scheme and similar origins; five parties of students from Agricultural colleges, teacher training colleges and junior farmer clubs; and 83 visitors from the Department of Agriculture, the C.S.I.R.O., and other government departments.

Farmer Co-operatives in Extension.—Some 90 growers were brought together for Red Scale Conferences organised by Griffith Producers' Co-operative Society and Leeton Citrus

Growers' Association. Leeton Fruitgrowers Co-operative Society convened a peach grower meeting attended by 100. A meeting convened by I.R.E.C. in the fruit fly campaign drew 220 people. The various Italian farm-community gatherings at Griffith and Leeton aggregated about 1,000 people. Field days on concentrate spraying, weed control, beef cattle production, etc., have benefited by the activity of co-operative societies in bringing their members under extension service influence.

The M.I.A. Organiser offers the attendance figures to support his report that "no more effective series of 'farmer-get-togethers' is on record (in the M.I.A.) than those of the past year, and the lead given by farmer co-operatives is of first importance in strengthening the attack on our district problems".

"Buildings for the Climate" Conference.—Wade Shire Council and the Service collaborated to convene this conference. Seventy people attended, representing interested organisations including government departments, local government bodies, financial institutions, architects and builders. The aim was to agree on principles for design of town and farm homes in this climate. Recommendations of the conference have been summarised and printed as a 4-page brochure. The Royal Australian Institute of Architects, of New South Wales and of Victoria, are making available, through their respective Small Homes Services, plans of town and country homes which conform to the recommendations.

Talks on Home Service.—An officer of the M.I.A. Agricultural Service has addressed 23 meetings on topics such as "Homes for the Inland", "Kitchen Planning" and "What is Home Service". The officer also addressed the biennial conference of the Country Women's Association of Australia, in Adelaide.

Staff Training.—Staff sessions on "Extension" and "Creative Leadership" have been conducted.

Working with Committees.—Each field officer has taken some part in committee work. Committees, conventions, conferences in which one or more officers have participated included:—the I.R.E.C., I.R.E.C. Executive Sub-committee, and I.R.E.C. sub-committees respectively for land-use planning, rice industry, vegetable industry, and reclamation and drainage; the Winter Watering Advisory Committee; the Producing Industries Advisory Committee; the M.I.A. Fruit Fly Committee; the Red Scale Conference; the Canning Fruits Convention; the Regional Conference of the Division of Horticulture; Extension Group Committees; the District Council of Extension Groups; the Junior Farmer Clubs' Advisory Committees and District Councils; and numerous staff conferences arising from specific projects.

Agricultural Engineer.—This appointment was made possible by the Commonwealth Bank's Rural Credits Development Fund. The appointee has completed eighteen months of service, during which he has made a survey of the tractors, machinery, workshops and allied mechanisation facilities on farms in the Area. He is now ready for more active promotion of services for the M.I.A. farmers. Meanwhile he has received and handled a wide range of requests for advice—"what tractor will I buy?"—"how may I prevent damage to my pipeline when the pump is switched on?"—and so on.

Italian Liaison Officer.—This appointment was made in January, 1954. Commonwealth Agricultural Extension Grant funds made possible the appointment. Previously the M.I.A. Agricultural Service lacked effective extension to Italian-origin farmers who now comprise over 40 per cent. of the 800 horticultural farmers in the M.I.A.

The officer has worked principally by personal contact and has visited almost every horticultural farm and more than half of the vegetable growers. He has, however, also worked to stimulate group activity, associating with farmers' extension groups and cultural groups within the Italian community. In the vegetable industry survey by the Division of Marketing and Agricultural Economics the Italian liaison officer's contact with Italian-origin farmers was invaluable.

Integration of Italian Community—Further Moves.—A Continental Handicrafts Exhibition was organised, in collaboration with the Country Women's Association, the New Settlers' League and the Continental Music Club, to promote good-will and co-operation between the Italian and Australian sections of the M.I.A. community. Over 500 people attended. The Consul-General for Italy opened the Exhibition, which promoted the prestige of the M.I.A. Agricultural Service with the Italian community.

An officer of the M.I.A. Service is honorary secretary of the Griffith branch of the New Settlers' League. Another is honorary secretary of Griffith Continental Music Club and Griffith Community Committee.

The Community Committee is a new development which aims to be a focal point for expression of opinion or taking of action by the Italian community. Numerous illustrations of the useful functions have occurred during the year.

Extension Groups.

The eight Extension Groups averaged four meetings for the year, and helped to crystallize farmer opinion which gave leads to administrative bodies affecting the Area.

Value of the Groups as focal points of immediate co-operative action in emergency was illustrated when the M.I.A. Fruit Fly Committees sought their aid. The Groups held meetings and aroused district consciousness of the economic dangers to the M.I.A. occasioned by the fly.

The District Council of Extension Groups, the co-ordinating body for the eight groups, met at half-year intervals. The Council's Executive met more frequently.

Obituary.—The death of Mr. George S. Denne, to whom special tribute was paid in last year's report for his work in the tile drainage project, is recorded with a deep feeling of loss. Mr. Denne was Secretary of the District Council of Extension Groups and of the Tile Drain Committee. In three years he set standards for the tile drainage scheme of the M.I.A. which may not be equalled.

Publications, Press and Radio in M.I.A. Extension.

Farmers' Newsletter.—Four editions of the large-area farm and four of the horticultural farm newsletters were produced. Twelve thousand copies, in all, were distributed during the year. The necessity to get important news to horticultural farmers gave rise to an increase from 20 to 24 pages in three of those editions. Regular consultations with the Rice Growers' Association and the Rice Marketing Board is a routine feature in the planning of the large-area editions.

Weekly, Syndicated Column.—This column, now typically comprised of four items dealing with large-area and horticultural farm problems, continued to be syndicated weekly to six newspapers and radio stations within the M.I.A. sphere of influence.

Extension Notes, Ronco-ed.—Weekly extension notes, dealing with a major problem of the week, have been distributed throughout the year to the six newspapers and radio stations in the M.I.A. sphere and to twenty other newspapers and journals which have requested them because they have some circulation in the M.I.A.

The extension notes and the syndicated column are now distributed also to the field officers of Leeton Co-operative Canery and Griffith Producers' Co-operative Society.

Special Releases.—Three special releases per week, on the average, have been made. These range from specific pest and disease control reminders to general extension group activities. They are vital in publicity arising from special campaigns.

Bulletins.—Only about 100 of 2,000 copies of the M.I.A. Orchard Spray Calendar remain because of steady demand. An up-to-date edition was near to publication at 30th June, 1955. The bulletin *How to Improve Your Kitchen* has been so popular that only 200 of the 2,000 edition are in hand. A Report to You arising from the conference on "Houses for the Climate" was published, and the stock of 500 has diminished rapidly.

Pamphlets.—M.I.A. plant quarantine was aided by a pamphlet, of which 2,000 copies were distributed to residential blocks by fruit inspectors. For the fruit fly campaign, 16,000 copies of a special pamphlet were arranged in addition to a series of special press releases.

Radio.—Close co-operation with the A.B.C. was sustained. Over 200 items of extension information from the M.I.A. were broadcast from A.B.C. Station 2CO. That was in addition to individual A.B.C. broadcasts by six of the M.I.A. officers. Some of the recorded talks were re-broadcast, in the A.B.C. Country Hour.

The radio schedule of the M.I.A. Service also included weekly information sessions broadcast from 2RG (Griffith) and, for part of the year, a weekly dramatised feature, on a major extension matter, from 2RG and 2WG (Wagga).

Recorded and personal broadcasts totalled 189 for the year.

Ciné Films.—The film "Houses for the Climate" was completed and has been screened for many meetings. A film on "Ditches and Grades", being made by the C.S.I.R.O. film unit in collaboration with the Service is almost ready for release. The C.S.I.R.O. film "Salting and Soil Reclamation" has been screened several times this year in the M.I.A. because of its presentation of a theme vitally important to the future of this Area.

"Establishing Irrigated Pastures" is in production by the Division of Information and Extension Services in association with M.I.A. and Murray River district officers. The photography and editing are complete, and the film is expected to be released shortly.

Projects.

Extension Programming.—Programming of particular matters for special extension activity was formally introduced in the previous year as between Service officers and the representatives of large-area and horticultural farmers. The system continued.

Large-Area Programme.—In 1953-54 it was initially programmed that in 1954-55 the extension service would give particular attention to pastures (grazing management, fodder conservation, and weed control), pasture seed production (sub. clover, white clover and grass seed), sheep quality, and internal parasites control. Appropriate actions were taken by the Service in 1954-55—through timely publicity campaigns, individual contacts, special field days and demonstrations.

Horticulture Programme.—In 1953-54 it was mutually programmed that the Service would press the importance of the soil auger as a means of checking on irrigation timing, the control measures for apricot shot-hole disease and for black spot disease of pome fruits. Timely publicity campaigns, addresses at extension group meetings, special leaflets, show exhibits, and individual contacts were in due course used in those directions. The results gratified the Service.

1955-56 Programmes.—During 1954-55 the District Council of Extension Groups representing the interests of horticultural farms has requested that in 1955-56, special extension attention be given to:—

Rust of stone fruits, red spider, red scale, light brown apple moth, citrus quality, weed control in ditches, and orchard hygiene.

The large-area farmers' representatives had not crystallized their priorities at the time of this Report.

Rice Industry.—A percentage increase in the M.I.A. rice harvest has far reaching effects on the M.I.A. economy. It is of special interest therefore to report that the foundation seed on a farm at Yenda, which will seed down in 1955 the several seed rice farms to produce seed for the whole industry in 1956, yielded over 4 tons per acre for 60 acres.

A useful series of demonstrations was conducted by the Service in respect to changes in the moisture content in maturing rice crops. Sun-checking of rice, giving rise to cracked grain in milling, is a major economic problem. This season's work confirmed earlier findings of the Leeton Experiment Farm, that rice harvested at about 16 per cent. moisture and artificially dried gives a minimum of cracked grain in milling. The field assistant and utility truck provided for the M.I.A. Service by Agricultural Extension Grant funds facilitated this project.

Concentrate Spraying.—A "mist-blower" machine of the "Okanagan" type was acquired by the Department for location at Yanco Experiment Farm with Agricultural Extension Grant funds. A full season's programme of demonstrations has been concluded, and tentative recommendations for concentrate spraying are available to farmers who own "mist-blower" machines.

The "mist-blower" contrasts to the orthodox spraying equipment by blowing a large volume of air carrying spray particles in the air stream and, in addition to taking the hard labour out of spraying operations, may have the advantage of reducing the errors incurred by hand-labour.

Weeds.—Weeds in irrigation ditches, in external supply and drainage as well as internal farm ditches, are an increasing problem. Nutgrass, bindweed, Johnson grass, hoary cress and some other serious perennials are extending in the horticultural areas. Rushes and sedges are a problem on some large-area farms.

A low-volume weed sprayer made available through Agricultural Extension Grant funds has been demonstrated at field days which have been followed by further field days when the results were apparent.



Rice Record.

The rice crop, 90,000 tons, was a record. In the M.I.A. the average was 2.5 or more tons per acre. Even in the newer Murray River rice areas the crop averaged 2½ tons per acre. The Pure Seed Rice Scheme, improved layouts and widespread soil fertility uplift through pastures in the rotation are the reasons.

(Photo from Barham Office.)

The District Council of Extension Groups has especially asked that the weeds problem be subject of a vigorous campaign by the M.I.A. Agricultural Service in 1955-56.

Irrigation by Pumping from Rivers.—This development continued to be an important feature.

On the Lachlan River and Willandry Creek there are 37 pumping licences, covering the irrigation of 10,000 acres. Over 3,000 acres have been developed in the past year. Similar progress is apparent on the Murrumbidgee River.

The standard of ditch-building, contouring, etc., exceeds that of the M.I.A. proper, a tribute to the effectiveness of the district agronomists.

The impact of this big development on fodder production and conservation in relation to sheep population may only be apparent when next there is a lean season in the non-irrigated country. Graziers now have confidence in their capacity to sustain flocks which would have been lost in past droughts.

Red Scale Campaign.—Following the previous year's pattern, a conference was convened by Griffith Producers' Co-operative Society. The big attendance showed the sustained interest of producers in this perennial problem. Seasonal conditions favoured the pest and led to a request that red scale control be a major item in the extension programme for the coming season.

Quarantine.—M.I.A. fruit inspectors had a most difficult season. In the eradication campaign which followed the detection of fruit fly in the area late in March, 1955, the M.I.A. officers, augmented by fruit inspectors from other districts, worked long hours, week-ends and holidays, to cope with the necessary measures.

Horticultural Census.—The pattern developed in recent years has continued. Three field surveyors visit each horticultural farm during the summer. They note the plantings pulled out and the new plantings, and estimate the productivity of the mature plantings.

The Yanco Experiment Farm Manager is chairman of the Land-Use Planting Sub-committee of the I.R.E.C. He has in hand a review of the planting trends over the 15 years of compilation of field data.

Aerial photographs on which the Census Revision is based were taken in December, 1950, and are out-dated for many purposes because of changes in plantings. This is particularly so in relation to use of farm aerial photographs for guidance of tile drainage designs. Action is in hand in respect to a fresh aerial survey in the summer of 1955-56.

Vegetable Industry Survey.—Officers of the Service some years ago raised a doubt of whether the vegetable industry of the M.I.A. would in the long run prove to have been good for the area. The effects on soil fertility and the incidence of soil-borne diseases were amongst their anxieties.

At the request of I.R.E.C. the Division of Marketing and Agricultural Economics is conducting a survey of the M.I.A. vegetable industry. The field work is complete and the data being analysed.

Farm Woodlots.—The three woodlot trials continued. Plantings in one of them, Farm 238 which is the property of the Service, were extended to 11 acres. Extensions to the woodlot and tree planting programme are continuously proposed as the value of trees in particular ways become more apparent. A "dry-area" trial using a novel method of watering from holes 2 feet deep lined with 4 inch diameter tiles is in hand, in collaboration with the Soil Conservation Service.

A full report on the woodlots project is made annually to the Irrigation Research and Extension Committee (I.R.E.C.), including detailed data from observations on species, growth, frost resistance and other characteristics. In addition, records are made of plantings on farmers' properties.

HAWKESBURY AGRICULTURAL COLLEGE.

Mr. E. A. Southee, O.B.E., M.A. (Oxon), B.Sc., B.Sc. Agr. (Syd.), F.L.S., retired from the Service after 33 years in the position of Principal. Mr. H. R. Richardson, B.Sc. Agr. was appointed Principal. Mr. A. Johnson, B.Sc. Agr. was appointed Deputy Principal vice Mr. Richardson.

Student Enrolment.—Admissions to 1st Year Agriculture were the highest ever, whilst enrolment in 2nd Year Agriculture equalled the 1949 record enrolment. The total enrolment equalled the 1953 record. Enrolment comparisons at the commencement of the first session were as follows:—

Course.	1953.	1954.	1955.
Agriculture—Third Year	64	55	55
Agriculture—Second Year	62	63	72
Agriculture—First Year	70	72	73
Horticulture—Third Year	...	...	...
Dairying—Second Year	8	9	6
Dairying—First Year	9	7	9
Food Technology—Second Year	6	4	5
Food Technology—First Year	5	6	4
Totals	224	216	224

Eleven of the students are from other States or overseas, whilst 55 per cent. are from N.S.W. country districts and many are members of Junior Farmer Clubs. The admission from Agricultural High Schools in 1955 was twenty-two.

It was possible this year to admit to the Agriculture diploma course all eligible applicants who had applied before May, 1953. Applications for admission to the diploma courses in Dairying and Food Technology have not in recent years exceeded half the available places.

Diploma Examinations.—Fifty-six students in the Agriculture diploma course were successful in the 1954 final examinations, five at Honours standard, including one First Class Honours. Nine students completed the Dairying diploma course, two at Honours standard. Four completed the Food Technology course.

Ex-Students.—The total of students since the inception of the College, including those now in residence, is 5,141. The proportion following vocations appropriate to their agricultural training is now estimated at 78 per cent.

Extra-curricula.—The Student Representative Council, the Sports Club, the Debating Society, the Camera Club, the Student Christian Movement, and the College branch of the Agricultural Bureau helped to promote the social life and welfare of the College.

Seventeen students enrolled in a Life Saving Class and were examined by the Australian Life Saving Society.

Rifle Shooting and tennis teams took part in the inter-Collegiate contests, held at Wagga Agricultural College.

The College debating team again reached the final of the inter-Collegiate competition sponsored by the Australian Broadcasting Commission.

College Library.—A complete stock-taking was carried out, and all books were located in the new building. There are now 2,180 books and 966 bound periodical volumes in the Library.

In addition to 220 new books, the library received the more recent back numbers of several important periodicals and arranged to receive the continuations. Many maps were added to the College collection.

A survey indicated that the new Library building and facilities, and altered hours, have led to a 400 per cent. increase in library usage.

Student Tours, Visits.—Senior students in Agriculture visited the M.I.A. for instruction in irrigation techniques. They also visited northern agricultural districts. Senior Dairy students made the annual tour of Hunter Valley dairy factories and of major dairy product and cold store establishments in the metropolitan area. All Food Technology students were conducted on inspections of commercial canneries, and the 2nd Year class visited the M.I.A. during fruit harvesting and processing. This class also spent several days at Gordon Edgell and Sons Ltd., Bathurst, to gain commercial experience of vegetable processing.

Students visited the Sydney Royal and the Sheep Show for educational purposes, including experience as stock attendants and/or competitors in stock judging.

University Undergraduate Courses.—The College regularly provided practical demonstrations in livestock husbandry and agricultural machinery matters for students in the 2nd Year of the Sydney University Faculty of Agriculture. These students visited the College one day each week.

Farmers' Schools, Conferences, Field Days, etc.—Winter schools for farmers were conducted respectively in dairy farming, poultry farming, vegetable growing and tractor maintenance. Schools in dairy farming and in pig-raising were provided for Junior Farmers. The summer school in agriculture was held after a lapse of four years, with a good attendance. A special school was organised to instruct seedsmen and interested growers in the technique of producing hybrid tomato seed. The annual Poultry Field Day and a Vegetable Industry Field Day were conducted.

The 30th Annual State Congress of the Agricultural Bureau of N.S.W., and a leadership school for members of the Agricultural Bureau, Country Women's Association, Junior Farmer Clubs, and other rural organisations, were held at the College in the winter vacation.

The College facilities were made available to the College of Retailing for a residential conference.

Buildings, etc.—Buildings completed were a four-stall shearing shed and a skin-drying shed. In addition a set of pre-fabricated sheep yards was erected. New yards and sheds have been constructed for the use of the Arab horse stud. Most of the outstanding items of plant and equipment for the new dairy produce factory were installed. Construction of a hay and grain dryer at the River Farm is near to completion. A heating system for the vegetable research glasshouse is being installed. Two new glasshouses are in course of construction for developmental and research work in plant nutrition and soil surveying. Funds for one of these glasshouses were made available from the Commonwealth Bank's Rural Credits Development Fund.

The roof of the blacksmith's shop was renewed and the whole building renovated. An extensive programme of building and alteration to existing buildings was carried out in the poultry section. The main office and the agronomy office were partitioned and painted. A quality control room was erected in cannery.

Change-over to the new 11,000 volt high tension line and installation of the new transformers have been successfully effected.

Changes in Curriculum.—Arrangements were made with the Department of Technical Education for separate classes in metal work and in carpentry and joinery, to improve the Agriculture diploma course.

The appointment of a full time lecturer in agricultural economics and farm management has facilitated changes in the syllabus for agricultural economics. These, to be effected over two years, provide for a 1st Year course in elementary economics and business principles, a more extensive course in agricultural economics in 2nd Year, and a 3rd Year course in farm management.

Sectional Operations at Hawkesbury.

College Farm.—One hundred and forty tons of wheat and oats hay were harvested from 216 acres. Prolonged rain during haymaking caused heavy losses from 120 acres. Only 9 bushels per acre of wheat, oats and barley were harvested off 150 acres due to water-logging of the soil. Some 400 tons of ensilage were made from 34 tons of maize and 4 acres of saccaline. There is now a good reserve of ensilage. At 30th June, 1955, 140 tons of cereal hay and a few tons of baled Wimmera Ryegrass hay were on hand. Eight acres of Japanese millet and 12 acres of saccaline were sown for fodder purposes.

Pastures previously sown and those sown early in 1954 were checked by the dry winter of 1954. Since then these pastures have made excellent growth. The area of pastures sown in the autumn of 1955 was 107 acres, and is well established. All sown pasture areas, 408 acres, received superphosphate in the autumn.

The new irrigation plant at the River Farm was brought into operation. Minor flooding in May thinned the lucerne stands. About 95 tons of lucerne hay were conserved.

Better facilities are now available for the Arab stud, and ten outside mares were received for service. A small Clydesdale stud is still maintained.

Machinery maintenance is assuming large proportions because of increased mechanisation. A machinery maintenance shed has been fitted out.

The College undertook in co-operation with machinery firms the testing of a number of items of machinery.

One new tractor was received on loan, and machinery firms replaced four others with later models. In all, twenty-four items of machinery were acquired, by loan from firms or by purchase. Tractor firms again helped to make a success of the winter school on tractor maintenance, attended by eighty-three farmers.

Orchard Section.—Reflecting the dry autumn of 1954 the Valencia crop was very light and the fruit small. The recent crop was much heavier. Fruit size, quality and yield of the Washington Navel crop were good. Peaches, apricots, plums and pears all yielded well.

A citrus variety collection was planted out in nursery rows, and will later be "balled-out" to permanent positions. Seedlings of trifoliata, pecan and apricot have been raised for later replanting and student instruction.

Codlin moth caused no trouble. Fruit fly was controlled well into mid-February. Red scale and sooty mould on citrus were worse than usual. Black spot showed up as a late infection towards the end of January. Brown rot in stone fruit and blue mould in citrus occurred mainly on previous injury.

Cannery and Food Technology.—The quality control laboratory recently constructed has improved the facilities for student instruction.

The pea viner was operated for the first time. Sufficient pea plantings was grown for a comprehensive instruction course in maturity prediction and processing of peas.

The cannery supplied 8,361 lb. of jam, meeting the College requirements. Processed fruits included 5,750 x 16 oz. cans and 5,000 lb. of pulps. Canned vegetables were equivalent to over 9,000 x 16 oz. cans. Quick frozen vegetables totalled 2,900 lb. Supplies of fruit for processing were drawn mainly from Departmental Experiment Farms, and included apricots, peaches, pears, plums, prunes, grapefruit and olives. Vegetables for processing were grown by the College, and included asparagus, peas, sweet corn, cauliflower, broccoli, carrots, tomatoes, cabbage and navy beans.

Dairy Produce Factory.—Record production of butter and cheese heavily taxed the old dairy factory's plant and equipment.

Installation of equipment in the new factory proceeded at a good rate. Excepting the condensed milk section and sections awaiting plant in use at the old factory, all manufacturing sections are near to completion.

The Institute of Dairy Factory Managers and Secretaries at their May, 1955 Conference, approved the College proposal to extend the Dairying diploma course to December each year. This will be effected in 1956.

Student numbers have not been sufficient to meet industry demand but are expected to increase by ten per year when the industry's apprenticeship scheme is introduced in 1956.

Second Year Dairy students competed in the annual grading competition conducted by the Dairy Factory Managers and Secretaries. They gained first, second and third prizes in cream grading.

The First Year Dairy students attended a Dairy Science School at Bega in September, 1954, and all passed the cream grading examination.

Dairy Research Section.—The dairy research officer published a paper on "Faster Milking", and prepared further articles on "Milk Composition" and "Cleaning of Milking Machines".

Trials commenced in 1953-54 were continued, as were investigations into oliphant germicidal ultra-violet lights; glass pipe lines for in-place cleaning; and rindless cheese manufacture.

Poultry Section.—At 30th June, 1955, the stock totalled 1,512 head. Egg production for the year was 20,987 dozen.

A winter school for poultry farmers and the annual Poultry Field Day were conducted in addition to normal College courses and the demonstrations to Second Year University students.

Breeding operations were carried out with White Leghorns, Australorps, Rhode Island Reds, New Hampshires and turkeys.

Because of increased interest in the production of table poultry, small flocks of Muscovy ducks and Emden geese have been introduced.

Some White Leghorn and Australorp day-old cockerels are being reared on a high energy ration, and data are being obtained on mortality, growth rates, and food consumption, up to a marketable condition at 16-18 weeks.

To produce early fleshing and early feathering males as sires of table poultry, a limited number of 2nd cross New Hampshire X (Plymouth Rock x Langshan) are being bred.

The 53rd Egg Laying Competition concluded on 23rd March, 1955. Results were comparable with previous years but a percentage of the birds greater than in previous years laid over 240 eggs.

The 54th competition is in two Divisions, viz., groups of birds housed singly in laying cages, groups of birds housed collectively in intensive houses.

The Second Random Sample Test concluded on 31st March, 1955. The Third Test commenced on 12th August, 1954. To 30th June, 1955, production has been lower than in the previous tests, due to bad weather.

In addition to an extensive programme of building and alterations in the Section, two electric hover brooders were purchased and a kerosene heated infra-red type brooder is on trial.

Sheep and Wool Section.—The stock is comprised of a Romney Marsh Stud (81 head); ration sheep; and a commercial flock (600, including 64 rams).

Blowfly prevention tests were continued in collaboration with the Entomology Branch. Various insecticides and application methods are under test.

A new 4-stand shearing shed, a skin drying shed, a set of pre-fabricated yards, and a new set of sheep weighing scales have been installed.

Third Year Agriculture students undertaking Stage II of the wool classing course maintained a high standard. Second Year Agriculture students (63) gained 36 "A" passes in the Stage I (leaving certificate) wool classing examination. There were no failures.

Apiary Section.—There were 64 hives at 30th June, 1955. Honey yield was 1,850 lb. Apiary operations were seriously retarded by the excessively wet weather.

Bee breeding along controlled lines by means of artificial insemination was restricted.

Seventy queens were distributed to beekeepers throughout the State. Two queens were supplied to the Tasmanian Department of Agriculture. One nucleus colony was air freighted to Thailand.

College bees and some of the extracting equipment were used at the Live Bee and Honey Extracting Demonstration at the Sydney Royal Show.

A summer school in apiculture was held this year after a lapse of four years.

Piggery Section.—Breeding stock at 30th June, 1955, comprised eleven boars (four Tamworths, four Berkshires, three Large Whites) and thirty-eight sows (twelve Tamworths, fifteen Berkshires, eleven Large Whites). The demand for stud stock fell away; stud sales were only 27 head compared to 97 head in 1953-54. Prices for market stock declined about 25 per cent. on 1953-54 figures.

Students had increased opportunity for practical bacon curing because of the regular weekly quota of carcasses processed at the factory.



Popcorn Hybrids have a Future.

The popcorn hybrid research has been successful. Production of certified seed is about to commence. Popcorn processors are awaiting assured supplies in quantity.

(Photo from Hawkesbury College.)

Creeps, heated with electric infra-red lamps, were installed in all farrowing pens. Feeding stalls for brood sows are in course of erection. An electric feed mixer of 500 lb. capacity was installed. A small spray irrigation outfit was installed, allowing irrigation of pastures.

A school for Junior Farmers was conducted.

Cattle Breeding and Management Section.—Two schools, one for dairy farmers and one for Junior Farmers, were conducted during the 1955 winter vacation.

The Jersey Stud at 30th June, 1955, totalled 103 head, including eight bulls on loan to farmers. The Friesian Stud totalled 104 head. Forty-six head of Jerseys and 26 head of Friesians were sold.

A yearling Jersey bull "Austral Park Edinburgh" was purchased at the Sydney Royal Show for 270 guineas. Four Jersey females were also purchased. These were "Blytheswood Jester's Belle" (310 guineas), "Bridestowe Treasure" (460 guineas), "Bridestowe Treasure II" (370 guineas), "Bridestowe Lorette II" (200 guineas). A young Friesian bull "Glenhope Model Posch" was imported from Tasmania at a purchase price of 200 guineas. An imported Friesian cow "Okains Royal Comet" produced 24,787 lb. of milk and 697 lb. of fat in 365 days.

The first importation of deep frozen semen arrived at the College late in June, 1955. It was selected by the English Milk Marketing Board for use in the College Friesian Stud.

The Aberdeen Angus Stud now totals 28 head. One Aberdeen Angus steer exhibited at the 1955 Sydney Royal Show secured first prize in the Aberdeen Angus carcass section.

Research Agronomy.—The maize breeding programme was terminated in 1954, but variety trials and fertilizer and spacing trials were continued. Field trials of sweet corn were continued. Breeding programmes for pop corn and sweet sorghum have expanded. Foundation seed of saccaline was supplied to registered seed growers to produce certified seed.

Vegetable improvement work continued, with a large number of introductions under test. The bean, pea and tomato breeding programmes continued.

With the exception of two new trials, pastures investigations were limited to the upkeep of trials established prior to 1954. A dehydrator purchased with funds made available by the N.S.W. Milk Board will be of great value in the pastures work.

Plant nutrition research progressed satisfactorily and will be intensified by the increasing facilities, notably two new glasshouses. One of the glasshouses is the result of a grant from the Commonwealth Bank's Rural Credits Development Fund.

WAGGA AGRICULTURAL COLLEGE AND EXPERIMENT STATION.

Student Enrolment.—Intake is still limited by available accommodation. Demand for enrolment continued firm and at the 30th June, 1955, bookings are closed to the end of 1961. A peak figure of 65 students was reached at the commencement of the first session, 1955. Comparisons at mid-year are tabulated:—

	Enrolled Students.		
	At 1-7-53.	At 1-7-54.	At 1-7-55.
Third Year	17	15	18
Second Year	21	16	22
First Year	18	26	23
Totals	56	57	63

Diploma Examinations.—All 15 students successfully completed the Agriculture course at the 1954 final examinations. There were no Honours at graduation.

Ex-Student Statistics.—At 30th June, 1955, there were 111 ex-students, 75 of whom had gained diplomas (including 10 Honours graduates). The remaining 36 left before the end of their second year at the College.

Of the 111 ex-students 63 are actively engaged in farm work, 18 are Departmental officers, 17 are employed by commercial firms with agricultural interests, 6 have left agriculture and the occupations of 7 are unknown.

A permanent board recording the roll of all graduates (W.D.A's) was installed in the College dining room.

The Old Boys' Union is now on a sound footing financially and as to membership. It held its fourth Annual Reunion in Wagga in April, 1955. Forty Old Boys and staff attended.

Student Tours.—Three regular tours, to the south-eastern Riverina, four days in October, 1954; Batlow, four days in November, 1954; and the Murrumbidgee Irrigation Area, five days in April, 1955, were undertaken by all senior students.

Various half- or one-day tours were conducted to prominent local sheep and/or cattle studs, the Soil Conservation Research Station, the Wagga Wagga Municipal Abattoirs, the Murrumbidgee Milling Company's flour mill, and the Murrumbidgee Co-operative Dairy Co. Ltd. factory.

Students also visited for educational purposes the R.A.S. Show, the M.P. and A.A. Show in Wagga and the Wagga Ram Show and Sales. Experience was gained as stock attendants and/or as competitors in stock and produce judging competitions. In the latter the students collectively enjoyed more than their share of success.

Extra-curricula Activities.—Students regularly engaged in Rugby Union football, athletics, swimming, rifle shooting, tennis, boxing and basketball.

The College acted as host College for the Australian Agricultural Colleges Sports Association Annual Contests in rifle shooting and tennis. For the first time it entertained teams from Dookie, Hawkesbury, Roseworthy and Queensland Agricultural College. On other occasions it fielded cricket and football teams versus Hawkesbury College; competed with Dookie College in swimming; and with Wagga Wagga Teachers' College in athletics. This extension of inter-collegiate sport afforded an opportunity for students to see other colleges and to mix with fellow students with many common interests.

Two new trophies were donated for annual award—the "Dangar, Gedye and Malloch Cup" for Cricket and the "Ex-student A. Badgery-Parker Prize" for Public Speaking.

An inter-year debating competition was promoted for the first time. A trophy for annual competition will be awarded for this contest.

A First Aid class was constituted for the first time. About 40 students received regular tuition from members of the Wagga Ambulance Station staff, and were formally examined for the St. John's Ambulance Certificate.

Officers of the Bank Education Service visited the College to deliver lectures on Banking and related facilities.

Official Functions, School Conferences, Field Days, Etc.—The College was honoured to receive visits respectively by His Excellency the Governor of New South Wales, Lt.-Gen. Sir John Northcott, the Premier of New South Wales, the Hon. J. J. Cahill, M.L.A., General His Excellency K. M. Cariappa, High Commissioner for India in Australia, and the Minister for Agriculture and Food Production, the Hon. E. H. Graham, M.L.A. The Minister set the foundation stone for the new administration block, which is to be called "The E. H. Graham Block", and presented the diplomas and prizes at the fourth Annual Diploma Day on 22nd April, 1955. The attendance was 450.

The 5th Junior Farmers' School in wheat and sheep husbandry commenced on the 27th June, 1955 (attendance 21).

The 3rd Turkey Raisers' School and Conference was held, commencing 5th July, 1954 (attendance 38).

The Annual Field Day was held on Friday, 29th October (attendance 120). It featured current agronomic research and drought feeding of sheep. Also in October, 1954, a crowd of more than 300 people attended at the College a field day under the auspices of a Friendly Society. Several small groups consisting of Junior Farmer Club members and overseas tourists, and individual overseas students or officers of Agriculture Departments and Universities in Ceylon, Pakistan, India and South Africa, visited the College. There were 17 such occasions.

The College provided facilities for regular meetings of the Southern Agricultural Region Advisory Committee. An Experiment Station "Policy, Objectives and Development" Conference was held at this College and Experiment Station in February, 1955.

An "Open Day" was also held during Education Week in August, 1954, but the attendance was disappointing.

Various College officers judged or acted as stewards at local Country Shows and assisted in other ways with extension work.

The acquisition of a tape recorder, by gift from the Bank of New South Wales, and of a public address system, have facilitated administrative, extra-curricula, and extension activities.

Library Service.—Approximately £120 worth of books was added to the College library. The range of film libraries from which the College borrows educational films was widened to include all existing local organisations.

Works and Improvements.—The Wagga Agricultural Research Institute was completed. The prefabricated glass potting shed was erected, an adjunct to the Institute glasshouse. The College carpenter completed the fencing around the Institute building. The filtered water supply reticulation to all existing cottages, Institute and College quarters, was completed. All buildings, yards and paddocks to accommodate the new Poll Shorthorn beef cattle stud were completed.

Work commenced in early February, 1955, on the administration block and other new buildings and alterations to existing buildings; and excellent progress was apparent within the year. A start was also made on the nine new cottages and a temporary officers' block. These also are progressing favourably.

Funds were procured to level the site of the new College Oval. This work would have been completed by 30th June, 1955, but for unfavourable weather.

Late in the year the employment of further tradesmen was approved, to bring the College strength to three carpenters and two painters. This group of employees will make a big difference to the progress and maintenance of the College buildings and quarters.

Sectional Operations at Wagga.

College Farm.—A policy of soil fertility improvement of the general farm was continued. A newly-cleared area of 150 acres was cultivated and cropped for the first time, and areas of old cropping land were sown to improved pasture.

Crop yields in 1954 were slightly below average, due to unfavourable spring and early summer conditions. The 333 acres of cereal crop sown for fodder production produced 3,428 bushels of wheat, 633 bushels oats, 342 bushels barley, 75 tons cereal hay and 75 tons of silage.

Seed wheat yields were satisfactory and the 255 bushels of seed of six varieties, less a quantity for the 1955 College sowings, were distributed to registered seed growers. Nine acres of cross-bred wheats were seed-increased for the Wagga Agricultural Research Institute.

The area of improved pasture was increased from 820 to 930 acres despite the ploughing of 150 acres of pasture to return this land of improved fertility to seed production. Six hundred acres of pastures were topdressed with superphosphate, at rates varying from 1 to 1½ cwt. per acre. Areas of improved pasture were made available to the Agricultural Research Institute for weed control and red-legged earth mite control experiments; and to the C.S. & I.R.O. for medic growth investigations.

The 120 acres of lucerne growing on the College provided excellent grazing, and produced also 110 tons of lucerne hay.

Favourable weather conditions enabled the 1955 cropping preparations to be completed before mid-June. The sowings were 247 acres of wheat for fodder (grain and hay), 35 acres of wheat for seed production (7 varieties), 76 acres of oats for hay, grain silage, 30 acres of oats for grain feed, 32 acres of oats for seed production (six varieties), and 7 acres of barley for seed production.

In addition, 10 acres of crossbred wheats were sown for the Agricultural Research Institute; and 25 acres of land were fallowed and prepared for Agricultural Research Institute plant breeding sowings.

Dairy Section.—The stud Jersey herd averaged 110 in number and 35 in milk. Production increased with a better season and improved control of mastitis.

From the dispersal of the Yanco Experiment Farm's Jersey stud, 16 cows, 9 heifers and 2 bulls have been received into the College stud and six more young heifers are to be delivered in the coming spring. During the year, 15 stud bulls and 19 cows and heifers were sold from the College Stud. Small teams were exhibited at the Sydney Royal with moderate success; and at Wagga Show with outstanding success.

Gravelling of the yards surrounding the bails was completed early in the year. Plans for the proposed new dairy buildings are being re-drawn.

It has been decided that both the dairy and beef herds shall no longer be listed as Brucellosis-free. Vaccination with strain 19 vaccine is to be instituted.

Piggery Section.—An average of 150 pigs of Large White, Berkshire and Tamworth breeds was maintained throughout the year. Carcasses supplied to the College kitchen as fresh pork and bacon totalled 143. An increase in the number of suckers born and reared per litter has been obtained by using smaller and lighter sows than those used in previous years.

A total of 47 stud pigs was sold to farmers in various parts of the State. One Tamworth boar was sold to the New Caledonian Government. Owing to instability of the industry in 1955, the demand for stud pigs was considerably lower than in the preceding twelve months.

Show teams were entered at both Sydney Royal and Wagga Shows. At the Wagga Show the awards were five Championships; eleven Firsts; three Seconds.

Temporary repairs have been effected to the slaughterhouse.

Horse Section.—Horse numbers remained more or less constant and at 30th June, 1955, there were 69 head, comprised of 4 entires, 38 mares, 18 geldings and 9 foals. Six broken-in horses were transferred to other institutions.

The Arab stud continued to produce high quality stock and five Arabs were sold to stud breeders in New South Wales and Victoria. The Arab horses shown at the Sydney Royal Show were highly successful, gaining one Championship, one Reserve Championship and four other prizes.

One visiting mare died from tetanus in March, 1955, proving the wisdom of vaccinating the College horses against this disease.

Beef Cattle Section.—The Poll Shorthorn stud is settling down in newly-completed yards and stalls. There are 26 head, including 18 cows and heifers, 6 heifer calves, one bull calf and one bull. A number of cows which were in calf when purchased have now calved, but a few of these calves were below the standard requirements of the stud and were therefore culled.

Weekly weighings have been carried out with all calves until weaned. Apart from the Wagga Show team, which is having a small amount of concentrates, the rest of the calves are being reared under equal conditions; and regular weighings will enable valuable data to be obtained on the progeny of different dams within the stud.

The sire "Kaluga Air Raid" has developed into a good-bodied animal. The first of his progeny, due shortly, is eagerly awaited.

Sheep Section.—Hand feeding was necessary in the latter half of 1954, but has since been discontinued except for supplements to young stud sheep.

At classing in October, 1954, 180 ewes were culled from the Dorset Horn flock and 230 ewes were mated to four stud rams, using hand service. Lambing to date is only fair, with 120 lambs surviving and tagged. Conception was low in those ewe groups mated to the two older rams.

Two rams were purchased from Lindsbury Stud, Cudal.

One hundred and fifty Corriedale ewes were mated to Dorset Horn rams in October, from which 95 per cent. of lambs were marked.

A team of 12 sheep shown at the Wagga Show was only moderately successful.

All sheep were shorn by students, under tuition, in August-September, yielding 25 bales of wool averaging 50d. per pound.

Fifty-five flock rams, three stud rams and 129 c.f.a. ewes were sold during the year, the demand for c.f.a. ewes being very strong.

Poultry Section.—The normal functions of student instruction and provision of eggs and poultry for the College quarters were carried out.

Breeding operations were drastically reduced because of an outbreak of pullorum disease in the fowls and turkeys. The incidence was 20 per cent. at first, but has now been reduced to 7 per cent.

Five turkey breeding pens have been erected and are being fitted with trapnest equipment. The first slatted-floor confinement rearing and weaning pen has been completed. Its suitability to Riverina conditions will be closely noted. All turkeys have been weighed fortnightly to obtain local growth-weight data.

Apiary Section.—There was a delay of some eight months in filling the vacancy of livestock officer (apiary). This contributed to the loss of the weaker hives which died out during the winter. A number of others had to be united to form stronger colonies. At present 22 hives are in good winter condition and are expected to build up to thirty hives following the first flow of the coming season. Approximately six tins of choice quality honey were extracted.

Orchard Section.—The long dry periods and early spring frosts effected a poor fruit set of almonds and olives, but other crops set fairly well. Mid and late summer rains sized the crop well. Soft fruits were all utilised within the College. About half the pome fruit was sold on the local market. The rest was used at the College, cool stored and withdrawn as required.

The new nursery site is in preparation for planting peach and apricot seed. Increased peach and apricot plantings are necessary for student instructional purposes. Terraces have been graded between the olives, and peaches will be planted along the contours on these terraces. A vacant block of one to one-and-a-half acres is being prepared for apricot planting, in which contour layout instruction will be included.

The parasitised olive scale from Yanco Experiment Farm has been distributed throughout the olive plantings. Rust was severe on susceptible stone fruits because of spray plant failure at critical times. Red Spider incidence was heavy in all susceptible fruits.

The fruit grader has been motorised. A pitting table, fruit barrow and pallets have improved packing and processing facilities. An insect-proof dried fruit locker was installed and has considerably reduced wastage caused by dried fruit moths.

The old almond windbreak has been removed.

AGRICULTURAL RESEARCH INSTITUTE, WAGGA WAGGA.

The Agricultural Research Institute, Wagga, was officially opened by the Hon. E. H. Graham, Minister for Agriculture and Food Production on the 30th October, 1954.

In the initial stages the research will be concerned with problems associated with the wheat industry in the southern areas of New South Wales with special reference to soil fertility, grain quality, wheat diseases, skeleton weed control, cereal crop and pasture improvement. Research programmes have been initiated in a number of these fields.

Wheat Improvement.—The 1954 crop season was most difficult. Failure of the normal winter rains checked the growth of wheat crops and the Wagga field trials were abandoned. However, the trials at Condobolin and Temora Experiment Farms, together with trials on farmers' properties, yielded valuable results.

They indicated that some of the newer high quality varieties have a yield potential equal and perhaps superior to the standard Bencubbin. A replacement is being sought for Bencubbin which has long proved so popular in southern New South Wales in particular.

Javelin 48 performed especially well, and the Institute is arranging for further extensive trials during the 1955 season. One of the first projects of the newly appointed cereal chemist is to evaluate the quality of Javelin 48 and other promising varieties such as Curlew, Brolga, Kondut and Dirk 48. Those varietal studies will be made on crops growing on land of different fertility levels.

The Institute, now, is responsible for the breeding programme in southern New South Wales. In January, 1955, plans were formulated for the intensification and integration of the research and breeding investigations at Wagga, Temora Experiment Farm and Condobolin Experiment Farm. Basic studies of yield, phasic development and disease resistance have been planned as an aid to more effective future breeding work.

The glasshouse facilities at Wagga Agricultural Research Institute permit the growing of several generations each year, with consequent acceleration of the breeding programme. These facilities have already made possible the detection of valuable new sources of resistance to some of the more important diseases of wheat.

Oat Improvement.—The oat improvement programme for the southern region has been reorganised and will in future be centred at Temora Experiment Farm.

Special attention is being given to grazing characteristics. The provision of new dehydrating equipment has made possible a more accurate assessment of grazing yield in the varieties and crossbreds under attention.

Seed stocks of one crossbred F.F.G. Markton which has consistently yielded well are being built up in readiness for naming and release to farmers.

Hybridisation techniques have substantially improved.

Pasture Species Improvement.—An extensive improvement programme for subterranean clover and *Phalaris* species was commenced at Wagga in 1953 but staff changes interrupted this work. A comprehensive collection of material, from Australia and overseas, has been assembled in preparation for regional assessment trials.

The subterranean clover material has been classified into maturity groups, with special attention to early maturing strains which may prove superior to those grown in the drier

areas of the Wagga region. Clover rust (*Uromyces trifolii*) appeared in the plots during November, 1954. Though most commercial varieties were susceptible several of the newer strains proved highly resistant.

The increasing areas of improved country in the southern wheat belt emphasise the need to develop suitable perennial grasses. Three species of *Phalaris*, *P. tuberosa*, *P. truncata* and *P. caerulea*, have been selected for study. A successful inter-specific hybrid has been made between *P. tuberosa* and *P. caerulea*.

The lucerne improvement work is conducted by the Institute at Temora Experiment Farm and in the past year an extensive range of clonal material has been assembled in preparation for selection and hybridisation studies.

Weed Investigations.—Low volume spraying experiments were carried out on 20 acres of cereal crops and 15 acres of improved and natural pastures for the control of serious weed plants. The experiments included the study of application rates at various growth stages, comparisons of several volume applications, and observations on new formulations of hormone-like, selective weed killers.

With respect to skeleton weed control, the effectiveness of selective herbicides depends upon active growth of the plant for translocation of the hormone throughout the plant system. Unfortunately drought conditions during the spring months so reduced the plant growth that most of the experiments failed to produce results.

Plant Disease Studies.—Under clover ley farming conditions in southern New South Wales the incidence of wheat take-all (*Ophiobolus graminis*) and several other root rot diseases tend to increase.

Current investigations aim to determine whether the association between root rot incidence and higher soil fertility status is due to nitrogen promoting survival of the root rot fungi in ploughed-in residues of grass components of the leguminous pastures. The capacity of wheat root fungi to survive in straw, buried in soils of high and low nitrogen status, is being investigated.

The fungi under test are *Ophiobolus graminis*, *Fusarium culmorum*, *Helminthosporium sativum*, *Curvularia ramosa* and *Rhizoctonia solani*. Their survival will be assessed at selected intervals over a period of two years.

Research and investigational projects in hand at the various Experiment Farms and Stations, and at Hawkesbury and Wagga Agricultural Colleges, are for the greater part incorporated in the reports of the respective Divisions of Plant Industry, Animal Industry, Dairying, and Horticulture.

Yours faithfully,

R. J. NOBLE,
Under Secretary and Director.
26th August, 1955

APPENDIX I.

The Accounts of the Department of Agriculture, 1954-55.

There was an increase in the expenditure from Consolidated Revenue Fund and General Loan Account during the financial year:—

COMPARATIVE STATEMENT OF EXPENDITURE.

Account.	1953-54	1954-55	Increase.
	£ s. d.	£ s. d.	£ s. d.
Consolidated Revenue Fund	2,837,462 10 9	2,975,303 12 6	137,841 1 9
General Loan Account	145,447 2 2	167,626 1 11	22,178 19 9
Totals	2,982,909 12 11	3,142,929 14 5	160,020 1 6

EXPENDITURE FROM GENERAL LOAN ACCOUNT.

The loan expenditure for the year was £167,626 ls. 11d., of which £70,663 ls. 4d. was spent at Hawkesbury Agricultural College; £65,014 2s. 0d. at Wagga Agricultural College and Experiment Station; £30,182 4s. 1d. at Experiment Stations and Nurseries; £906 8s. 7d. at Glenfield Veterinary Research Station; and £2,950 on Public Watering Places in the Western Division of the State. An amount of £2,089 14s. 1d. was received from Pastures Protection Boards for instalment on rabbit destruction equipment supplied to them, the cost of which was met from General Loan Account.

SPECIAL DEPOSITS ACCOUNT.

Swine Compensation Fund.

In terms of the Swine Compensation Act, 1928-1935, this Fund was established for the payment of compensation to owners of pigs destroyed and carcasses condemned in accordance with the provisions of the Act. The account is credited with moneys collected by the Commissioner of Stamp Duties in respect of swine duty, originally fixed at 1s. per head, reduced to 9d. per head from 1st March, 1935, and increased to 1s. 3d., per head on 1st October, 1945, and to 2s. per head from 1st May, 1948, on all pigs delivered for slaughter to an abattoir. Fines paid for breaches under the Swine Compensation Act, 1928-1935, are also credited to the Fund.

In the case of a pig ordered to be destroyed because it is suffering from or suspected of suffering from disease, the compensation is fixed by the Act at the full market value of the pig, less its residual value if on destruction it is found to be free from disease; and seven-eighths of the market value of the pig, less the residual value, if it is found to be diseased on destruction.

In regard to the compensation payable in respect of a condemned carcass, under the original regulations the amount of compensation was the full market value of the animal prior to slaughter, less the residual value of the carcass; one-third of such market value, less residual value in respect of condemned forequarters; and two-thirds of such market value, less residual value in respect of condemned hind-quarters. Under an amendment to this regulation made on 12th March, 1937, the amount of compensation for a condemned carcass was reduced to three-quarters of the market value of the pig immediately prior to slaughter, to one-quarter of such market value in the case of a condemned fore-quarter and to one-half the market value in respect of a condemned hind-quarter. The market value of any pig is not to be deemed for the purpose of the Act to exceed (a) if a pig is a stud pig, £20; and (b) if the pig is not a stud pig, £10. For the purposes of the regulation "stud" pig means a pig registered by the Australian Stud Pig Breeders' Society.

Prior to 31st December, 1937, compensation was payable in the case of various diseases, including Tuberculosis, Swine Fever and Anthrax. By a proclamation which came into operation on 31st December, 1937, all diseases, apart from the three specifically mentioned, were excluded from the provisions of the Act. By proclamation, Brucellosis was added to these diseases in January, 1941, and Septicaemia on 15th January, 1943.

In addition to compensation, the Fund is charged with the cost of printing and distributing swine duty stamps and expenses incurred in obtaining a determination of the valuation of a pig for the purposes of determining the amount of compensation.

The operations on the Swine Compensation Fund for 1954-55 are summarised hereunder:—

	£	s.	d.
Balance at 1st July, 1954	6,910	8	9
Receipts—Stamp Duty	59,431	16	8
	66,342	5	5
Disbursements—	£	s.	d.
Swine Compensation.....	35,870	12	3
Commission on Duty Stamps ...	243	8	1
Reduction of Advance made by Treasury	7,000	0	0
	43,114	0	4
Balance at 30th [*] June, 1955.....	£23,228	5	1

The fund was indebted to the Treasury in an amount of £9,000 at 30th June, 1955.

Fund Created by the Wheat Marketing (Barring of Claims) Act, No. 22 of 1929 (as amended by Act No. 38 of 1930).

In terms of the Wheat Marketing (Barring of Claims) Act, 1929, all claims against the Government in respect of old wheat pools were barred. The State Wheat Office was closed and the funds in the hands of the State Wheat Board were paid to the Treasury. After payments of expenses incurred in financial operations, such funds were to be applied in making certain payments to the University of Sydney and to specified trustees for purposes incidental to and in connection with research work, and the balance of the moneys invested by the Colonial Treasurer in Government stock, the interest therefrom to be spent on agricultural education or research as the Minister for Agriculture may direct. Any interest unexpended at the end of a year is to be capitalised.

No payments were received from the Roumanian Government in respect of Roumanian Bonds which were accepted subject to specified dates of payment in settlement of wheat supplied from early wheat pools.

At 30th June, 1955, the Fund had assets amounting to £36,893 6s. 0d., comprising Australian Consolidated Inscribed Stock £34,260; cash in bank £2,333 18s. 11d.; and accrued interest £299 7s. 1d. These figures are exclusive of assets in course of realisation, amounting to £24,620 (less £1,108 principal repaid) approximately, representing the balance of the New South Wales share of the original value, viz., £120,000, of Roumanian Bonds held by the trustees of the Australian Wheat Board, Melbourne, on account of the various States.

No payments were made from the Fund during the year, but an amount of £1,159 10s. 3d. was set aside to meet outstanding commitments.

The Revenue Account and Balance Sheet of the Fund for the year ended 30th June, 1955, are shown hereunder:—

REVENUE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1955.

	£	s.	d.		£	s.	d.
To Commitments—30th June, 1955	1,159	10	3	By Interest on Investments (Government Securities)	1,136	7	10
				„ Bank Interest	23	2	5
	£1,159	10	3		1,159	10	3

BALANCE SHEET AS AT 30TH JUNE, 1955.

LIABILITIES				ASSETS.			
	£	s.	d.		£	s.	d.
Accumulated Funds as at 1st July, 1954	34,596	8	7	Investments in Government Securities (face value)	34,260	0	0
Unexpended balance of commitments at 30th June, 1955	1,137	7	2	Balance at Commonwealth Savings Bank	2,333	18	11
	35,733	15	9	Interest accrued at 30th June, 1955	299	7	1
Commitments—30th June, 1955	1,159	10	3				
	£36,893	6	0		£36,893	6	0

Western Division Public Watering Places Fund.

The controlling authorities of Public Watering Places in the Western Division of the State are required by section 78 (3) of the Pastures Protection Act, No. 35 of 1934 to pay to the Minister not later than 31st January in each year all moneys in their Public Watering Places funds in excess of the sum of £100. The moneys so paid to the Minister are credited to a Special Deposits Account at the Treasury called the "Western Division Public Watering Places Fund". The moneys so credited are used in the construction or maintenance of tanks, dams and other structures, machinery or works for storing or providing water or otherwise improving Public Watering Places in the Western Division.

The operations on the account during 1954-55 are shown hereunder:—

	£	s.	d.
Balance as at 1st July, 1954	10	5	
Receipts	840	2	11
	840	13	4
Payments	840	13	4
Balance at 30th June, 1955	Nil		

Noxious Insects Destruction Account.

Section 10 (1) of the Noxious Insects Act, No. 22 of 1934, provides that such Pastures Protection Boards as are from time to time specified by proclamation published in the *Gazette* shall in each year make and levy a special rate in the amount prescribed in respect of such year on each owner or occupier of ratable land within the district in respect of large stock and sheep for which he is liable to pay rates under Part II of the Pastures Protection Act, 1912, or under any Act amending or replacing same.

Section 10 (1) of the Act was amended during 1954 by increasing the amount of the special rate which may be levied from one penny to threepence per head in the case of large stock and from one-sixth of a penny to one half-penny in the case of sheep.

The amount received in respect of rates so levied are paid by the Boards to the Minister as a contribution to the cost of suppression and destruction of noxious insects.

All contributions received by the Minister are paid into an account in Special Deposits Account at the Treasury called the "Noxious Insects Destruction Account". Moneys at the credit of such account are applied by the Minister to the purchase of materials for the purposes of the Act and to repay to the Colonial Treasury any moneys advanced by him.

Receipts and payments for each year since the passing of the Act in 1934 are shown hereunder:—

Financial Year.	Receipts from Pastures Protection Board.			Payments.		
	£	s.	d.	£	s.	d.
1934-35.....	925	14	10	10,274	8	8
1935-36.....	1,712	1	0	731	10	10
1936-37.....	7,941	2	4	2	4	7
1937-38.....	8,707	11	11	42,161	1	11
1938-39.....	27,495	5	3	8,244	8	10
1939-40.....	17,032	2	6	5,676	16	4
1940-41.....	7,936	12	5	1,858	5	11
1941-42.....	1,169	6	3	94	16	0
1942-43.....	772	4	0	641	10	8
1943-44.....	221	1	6	1,323	16	0
1944-45.....	393	15	4	250	5	5
1945-46.....	40	17	1	48	16	8
1946-47.....	524	16	2	4,823	2	10
1947-48.....	1,913	0	6	5,534	18	6
1948-49.....	11,099	15	2	3,197	6	9
1949-50.....	664	16	3	616	13	9
1950-51.....	924	11	0	1,564	4	9
1951-52.....	46	11	5	128	16	0
1952-53.....	1	0	0	85	14	5
1953-54.....	4,404	14	0	128,949	2	7
1954-55.....	51,588	0	3	176,497	14	8
	145,514	19	2	392,705	16	1
Add advance by Treasury	260,000	0	0	.....		
Less Sale of Materials	.....			257	1	3
				392,448	14	10
Balance in Special Deposits Account at 30th June, 1955 .....	.....			13,066	4	4
£	405,514	19	2	405,514	19	2

The following is a summary of transactions on the Noxious Insects Destruction Account for the financial year 1954-55:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Balance at 1st July, 1954	27,718	17 6	By Material	169,399	19 7
„ Advances for Departmental Working Account ...	120,000	0 0	„ Travelling Expenses	143	18 2
„ Levies from Pastures Protection Boards	51,588	0 3	„ Purchase of Motor Vehicle	1,136	6 3
„ Sale of Material	257	1 3	„ Maintenance of Vehicles	348	6 3
			„ Wages	1,610	15 11
			„ Payroll Tax	16	9 5
			„ Purchase Equipment	1,127	10 8
			„ Equipment Repairs	340	18 2
			„ Postal and Telephone Costs	369	8 2
			„ Commission	109	4 7
			„ Rentals and Hirings	58	2 5
			„ Freight and Cartage	585	12 5
			„ Advertising	148	12 3
			„ Printing and Stationery	52	4 3
			„ Expenses of R.A.A.F.	1,050	6 2
				176,497	14 8
			„ Part Repayment of Advance	10,000	0 0
				186,497	14 8
			„ Balance at 30th June, 1955	13,066	4 4
				£199,563	19 0
	£199,563	19 0			

Pastures Protection Boards of New South Wales—Subsidy to Glenfield Veterinary Research Station.

The Council of Advice of the Pastures Protection Boards of New South Wales agreed in 1934 to meet the salaries and travelling expenses of two research officers in veterinary science to be attached to the Glenfield Veterinary Research Station and to defray the cost of such materials and experi-

mental animals as may be agreed upon. The subjects of major research on which officers are to be engaged are decided upon by the Council on the recommendation of a committee consisting of the Chief, Division of Animal Industry, and the Director of Veterinary Research.

The following is a summary of transactions on the account for the financial year 1954-55:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Balance at 1st July, 1954	420	19 5	By Salaries	1,447	14 0
„ Contributions from Council of Advice to Pastures Protection Boards	1,200	0 0	„ Travelling Expenses	13	6 0
			„ Payroll Tax for 1953-54	29	19 11
			„ Workers' Compensation Insurance Premiums ...	28	5 0
			„ Advertising	9	9 0
				1,528	13 11
			„ Balance at 30th June, 1955	92	5 6
				£1,620	19 5
	£1,620	19 5			

Veterinary Surgeons' Act, No. 25 of 1923.

The Act provides for the establishment of a Board to be called "Board of Veterinary Surgeons of New South Wales". Fees and penalties collected under the Act are paid to the

credit of Consolidated Revenue Fund, from which administrative expenses are met. At 30th June, 1955, there were 365 registered Veterinary Surgeons.

The Statement of Receipts and Payments for the financial year 1954-55 is shown hereunder:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Registration Fees	29	8 0	By Salaries	479	12 2
„ Restoration Fees	4	4 0	„ Board Fees	116	11 0
„ Roll Fees	682	5 2	„ Travelling Expenses of Members	26	16 6
„ Examination Fees	52	10 0	„ Postage	15	3 7
	£768	7 2	„ Examination of Foreign Graduates	83	1 2
„ Excess of Payments over Receipts	20	11 3	„ Printing	67	14 0
	£788	18 5		£788	18 5

Contribution by Milk Board Towards Cost of Herd Testing.

In 1937, the Chief Veterinary Surgeon of the Department was appointed as Consulting Veterinarian to the Milk Board to supervise and control the testing of cows for tuberculosis and matters associated therewith. The Milk Board agreed to provide up to £1,250 per annum from 1st July, 1937, to meet the cost of the services to be performed by the Depart-

ment. This contribution was varied from time to time in accordance with the rise and fall in the actual expenditure. From the financial year 1952-53 the Board agreed to meet the actual cost of T.B. Testing of herds, estimated at £3,315 13s. 10d., which sum was exclusive of the salaries of two office assistants attached to the Department for the carrying out of records and statistical work and whose salaries are paid direct by the Milk Board.

Potato Growers' Licensing Act.

The transactions on the Special Deposits Account for the financial year 1954-55 are as follows:—

Transactions on the account for the financial year 1954-55 are shown hereunder:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Balance at 1st July, 1954	2,779	7 9	By Salaries and Wages	1,411	17 1
" Sale of Wool	3,930	12 10	" Payroll Tax, 1953-54	19	17 8
" Sale of Livestock	304	18 0	" Purchase of Livestock	271	0 0
" Sale of Sheepskins	7	4 0	" Freight and Cartage	83	0 9
" Agistment Fees	34	16 9	" Extension of Electricity to Drought Feeding Unit at Veterinary Research Station ...	446	15 6
			" Plant Repairs	66	8 9
			" Fencing and Fencing Repairs	303	8 1
			" Insurance	29	19 6
			" Additions to Buildings	379	13 4
			" Field Day Expenses	1	0 0
				£	s. d.
			" Farm Supplies	1,095	11 5
			Less credit for drums returned	29,10	0
				1,066	1 5
			" Purchase of Plant	94	15 0
				£3,873	17 11
			" Balance at 30th June, 1955	3,183	1 5
				£7,056	19 4
	£7,056	19 4		£7,056	19 4

Flood Relief.

On 25th February, 1955, and following days, major floods occurred in a number of districts of this State. Funds were made available to the Flood Relief Committee by the Commonwealth and State Governments on a £ for £ basis for the making of grants to farmers and householders who suffered loss which placed them in necessitous circumstances. The United Kingdom Government made a contribution of £313,437 10s. 0d., while proceeds from appeals and contributions from other sources received by the State Government amounted to £128,412 17s. 6d.

At the close of the financial year grants had been made to 921 primary producers and 7,535 householders, while 596 accounts had been paid for supplies and services. The expenditure to 30th June, 1955, amounted to £1,012,637. A further sum of £38,457 was spent in connection with the floods which occurred in 1954.

Commonwealth Dairy Industry Extension Grant.

The Commonwealth Government has agreed to the continuance of the grant for a period of five years, ending 30th June, 1958, under the terms and conditions set out in the Department's report for the year ended 30th June, 1953.

The first grant was received in October, 1948, and the expenditure to 30th June, 1955, amounted to £405,474 9s. 0d. under the following headings:—

Item.	1948-49 to 1953-54.			1954-55.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.
Organising Officers	67,464	1	1	8,684	6	0	76,148	7	1
General Publicity	33,824	16	2	4,653	9	9	38,478	5	11
Demonstrations	99,988	5	8	12,435	9	0	112,423	14	8
Competitions	7,437	7	4	.....	.....	.....	7,437	7	4
Field Days	88	15	7	.....	.....	.....	88	15	7
Herd Recording	84,735	17	10	16,432	6	3	101,168	4	1
Artificial Insemination	30,265	4	8	9,097	6	9	39,362	11	5
Statistical Work	6,390	9	10	3,435	13	3	9,826	3	1
Herd Surveys	17,119	1	0	3,421	18	10	20,540	19	10
	£ 347,313	19	2	58,160	9	10	405,474	9	0

Expansion of Agricultural Advisory Services.

The Commonwealth Government approved of the continuance of the Extension Services Grant for a period of five years ending 30th June, 1957, at an amount of £200,000 per annum.

At a meeting of the Standing Committee on Agriculture held in April, 1953, it was decided to recommend to the Agricultural Council that whatever moneys were granted by the Commonwealth to the States under the Extension Services Grant for the financial years 1953-54 to 1956-57 inclusive, should be allotted to the respective States in the same proportion as the £176,000 made available for the use of the States in 1952-53. Under this allocation New South Wales received £50,000 per annum.

The expenditure to date has been as follows:—

Financial Year.	Amount.
	£ s. d.
1952-53	981 8 11
1953-54	45,303 5 9
1954-55	51,116 18 7
	£97,401 13 3

The unexpended balance on the grant at 30th June, 1955, was £5,242 6s. 9d. The commitments against the Grant at 30th June, 1955, amounted to £21,165 0s. 0d.

Rural Training of ex-Service Personnel.

At the request of the Prime Minister the State Government undertook on behalf of the Commonwealth a Rural Training Scheme for ex-Service Personnel and agreed to make available for the purpose the necessary staff and facilities. Training has been provided at the Hawkesbury Agricultural College, Wagga Agricultural College and Experiment Station, Yanco Experiment Farm and on the properties of approved farmers.

The cost of training students at the Hawkesbury Agricultural College since the inception of the Scheme is as follows:—

Financial Year.	Amount.		
	£	s.	d.
1943-44 to 1952-53	94,088	0	7
1953-54	882	5	3
	£94,970	5	10

The amount of £882 5s. 3d. will be brought to account in the financial year 1955-56.

There were no students in residence at Departmental Colleges during 1954-55 under the Scheme.

It was found necessary at the commencement of the first term in 1948 to locate a number of first year trainees in the Hawkesbury Agricultural College Diploma of Agriculture Course at the Wagga Agricultural College and Experiment Station, owing to the inadequacy of accommodation at Hawkesbury Agricultural College. The cost of training students at Wagga was £6,120 13s. 7d. Upon completion of residence of students at Wagga, trainees were transferred to Hawkesbury Agricultural College at the commencement of their third-year training early in 1950.

The cost of conducting the short-term course at Wagga Agricultural College and Experiment Station and the Yanco Experiment Farm and the expenses associated with the trainees located with approved farmers are as under:—

Financial Year.	Amount.
	£ s. d.
1945-46 to 1953-54	£211,461 3 2
1954-55	794 18 10
	£212,256 2 0

Argentine Ant Eradication Campaign.

The campaign to eradicate the Argentine Ant was continued during 1954-55. Sixteen new areas of infestation were found between December, 1954, and June, 1955. Eight of these were in the Auburn Municipality, four in Parramatta City Council area, one at Botany, one at Circular Quay, one at Matraville and one at Arncliffe. This year's survey revealed that the overall control of the Argentine Ant population has been not less than 99.9 per cent.

The following is a Statement of Receipts and Payments covering the costs of the campaign for the year:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Balance at 1st July, 1955	870	5 4	By Wages	4,693	4 9
„ Consolidated Revenue Fund	4,500	0 0	„ Travelling	8	6 2
„ Contributions by Councils—			„ Plant		
Auburn	1,333	14 6	„ Stores	140	13 8
Bankstown	1	9 6	„ Spray Materials	2,556	0 0
Botany	536	17 5	„ General Expenses	619	17 6
Canterbury	96	2 8	„ Motor Vehicles Maintenance	148	2 7
Drummyne		5 0	„ Repairs to Plant and Machinery	62	1 2
Kogarah	1	19 0	„ Payroll Tax	111	13 5
Parramatta	160	3 5	„ Postages		
Randwick	7	10 7		8,339	19 3
Strathfield	7	5 11			
Waverley	1	3 8			
Department of Railways	65	1 3			
Sydney City Council	878	6 4			
		3,089 19 3			
„ Workers' Compensation Refund		12 6 5			
		£8,472 11 0	„ Balance at 30th June, 1955	132	11 9
				£8,472	11 0

Meat Inspection Service.

The Meat Inspection Service was transferred from the Metropolitan Meat Industry Board to the Department on 1st July, 1952.

The Board meets the cost of the service rendered to the Abattoir at Homebush Bay, while the cost of the service else-

where is covered by fees prescribed by Regulation under the Meat Industry Act, 1915-1952.

The following statement shows the cost of the service, the payments made by the Metropolitan Meat Industry Board and the Health Department and the revenue received from Inspection Fees charged under the Act for the year 1954-55:—

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
Homebush Abattoir—			Salaries	47,457	6 5
Metropolitan Meat Industry Board—			Payroll Tax	1,186	8 7
1953-54 Charges	1,035	17 4	Workers' Compensation Insurance.....	990	0 0
1954-55 Charges	51,238	16 2	Postal and Telephonic Costs	90	6 4
Overpayment—			General Stores	210	18 7
1954-55	936	3 7	Stationery and Printing	183	1 4
			Superannuation Contributions	1,118	6 9
			Advertising	2	8 2
	£53,210	17 1		£51,238	16 2
Other Slaughterhouses—			Salaries	74,311	11 11
Inspection Fees—			Payroll Tax	1,989	6 11
Regulation 7	62,439	15 6	Workers' Compensation Insurance.....	1,410	0 0
Regulation 8	16,208	3 2	Tea Money	1	7 0
Regulation 9	22,140	13 4	Employer's Superannuation Contributions	1,941	8 1
Regulation 10	845	8 0	Rent	119	13 0
	101,634	0 0	Travelling and Removal Express	5,262	7 0
Government Institutions	400	0 0	Freight and Cartage	10	12 11
	£102,034	0 0	Postal and Telephone Expenses	123	15 5
			General Stores	461	7 4
Knackeries—			Stationery	327	1 3
Health Department	1,651	7 4	Gas and Electricity	13	11 9
	£1,651	7 4	Advertising	11	11 2
				£85,983	13 9
			Salaries	1,459	11 6
			Workers' Compensation Insurance.....	30	0 0
			Employer's Superannuation Contribution	54	13 6
			Travelling Expenses	455	5 2
				£1,999	10 2

Cattle Compensation Act, 1951.

This Act came into operation on 1st September, 1952. Compensation is paid in the following cases—

- where an animal is destroyed under order of an Inspector (Stock Diseases Act, Meat Industry Act, or Cattle Slaughtering Act) because of specified diseases;
- where the carcase of an animal is condemned as unfit for human consumption by any such Inspector because of such disease.

Section 9 (2) of the Act provides that 20 per cent. of the compensation payable in respect of tuberculosis during the period of three years after commencement of the Act shall be paid by the Colonial Treasurer out of moneys provided by Parliament for the purpose.

During the financial year 1954-55, 6,012 claims were passed for payment covering 11,535 head of cattle. Compensation paid amounted to £179,954 7s. 9d.

The following tabulation shows the various diseases for which cattle were condemned and the amount of compensation paid:—

PAYMENTS FOR CATTLE COMPENSATION.

1st July, 1954, to 30th June, 1955.

Disease.	No. of Claims	No. of Animals.	Amount Paid.			
			Special Deposits Account No. 1265.	Consolidated Revenue Fund.	Total.	
			£	s. d.	£	s. d.
Tuberculosis	4,442	9,467	123,938	17 9	30,922	0 11
Actinomyces	920	1,148	13,097	17 9	.....	13,097 17 9
Cancer	631	883	11,361	17 0	.....	11,361 17 0
Pleuro-pneumonia						
Contagiosa	10	27	470	1 6	.....	470 1 6
Tick Fever	4	4	100	12 6	.....	100 12 6
Trichonomiasis	5	6	63	0 4	.....	63 0 4
Totals	6,012	11,535	149,032	6 10	30,922	0 11
Valuators Fees			30	6 0	.....	30 6 0
Commission for Sale of Stamps			761	2 9	.....	761 2 9
Grand Totals			£ 149,823	15 7	30,922	0 11

COUNTRY KILLING CENTRES.

The capital expenditure incurred by the Government on the erection of Country Killing Centres to 30th June, 1955, was as follows:—

	£	s. d.
Goulburn	419,063	12 6
Wagga	410,061	3 4
Dubbo	464,297	0 1
Gunnedah	166,993	10 5
	£1,460,415	6 4

STATEMENT OF REVENUE AND RECEIPTS—CONSOLIDATED REVENUE FUND—FINANCIAL YEAR 1954-55.

Institution.	Sale of Farm Produce and Livestock, etc.		Students Fees.		Rents, etc.		Other Receipts.		Gross Receipts.		Receipts Returned.		Nett Receipts.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Hawkesbury Agricultural College	12,380	0 2	18,843	11 6	5,660	9 6	884	19 9	37,769	0 11	557	5 0	37,211	15 11
Wagga Agricultural College and Experiment Station	12,141	0 8	4,797	10 9	4,809	3 11	288	7 11	22,036	3 3	344	15 7	21,691	7 8
Bathurst Experiment Station ...	12,034	6 1	.....	.....	194	8 4	11	12 7	12,240	7 0	.....	.....	12,240	7 0
Berry Artificial Stock Breeding Station	3,197	15 0	.....	.....	.....	.....	.....	.....	3,197	15 0	.....	.....	3,197	15 0
Condobolin Experiment Farm...	3,851	3 10	.....	.....	131	17 6	6	18 5	3,989	19 9	13	0 5	3,976	19 4
Coomealla Experiment Station...	.....	.....	.....	.....	64	16 9	.....	.....	64	16 9	.....	.....	64	16 9
Cowra Experiment Farm.....	2,582	9 10	.....	.....	107	5 3	9	17 0	3,699	12 1	.....	.....	3,699	12 1
Gosford Citrus Experiment Station	723	12 11	.....	.....	132	15 2	.....	.....	856	8 1	.....	.....	856	8 1
Grafton Experiment Farm	7,813	12 1	.....	.....	261	9 4	93	6 4	8,168	7 9	91	6 1	8,077	1 8
Griffith Viticultural Nursery.....	1,576	19 10	.....	.....	33	18 2	.....	.....	1,610	18 0	15	1 3	1,595	16 9
Leeton Experiment Farm.....	8,226	12 9	.....	.....	179	18 11	61	17 5	8,468	9 1	25	16 3	8,442	12 10
New England Experiment Farm	8,028	3 11	.....	.....	361	0 2	69	8 7	8,458	12 8	36	13 5	8,421	19 3
Seven Hills Poultry Experiment Station	5,583	19 9	.....	.....	156	2 8	6	15 9	5,746	18 2	.....	.....	5,746	18 2
Tamworth Agricultural Research Station	136	18 5	.....	.....	53	16 10	.....	.....	190	15 3	.....	.....	190	15 3
Temora Experiment Farm	4,969	2 2	.....	.....	365	18 3	27	4 1	5,362	4 6	1	10 0	5,360	14 6
Trangie Agricultural Experiment Station	19,429	1 1	.....	.....	1,762	4 0	210	9 4	21,401	14 5	135	19 9	21,265	14 8
Wollongbar Experiment Farm...	5,663	4 11	.....	.....	348	6 8	11	6 1	6,022	17 8	12	12 0	6,010	5 8
Yanco Experiment Farm	11,492	2 5	.....	.....	2,015	14 3	353	1 7	13,860	18 3	142	0 2	13,718	18 1
Less Receipts Returned	120,830	5 10	23,641	2 3	16,639	5 8	2,035	4 10	163,145	18 7	1,375	19 11	161,769	18 8
	321	14 0	251	0 2	803	5 9	.....	.....	1,375	19 11	1,375	19 11	.....	.....
Total	120,508	11 10	23,390	2 1	15,835	19 11	2,035	4 10	161,769	18 8	.....	.....	161,769	18 8

Section.	Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
		£ s. d.	£ s. d.	£ s. d.
Central Administration	Fees—Farm Produce Agents Act	307 1 0	.....	307 1 0
	Fees—Fertilisers Act	193 4 0	.....	193 4 0
	Fees—Veterinary Surgeons Act	768 7 2	.....	768 7 2
	Fees—Registration of Stock Brands	1,711 7 3	39 3 8	1,672 3 7
	Fees—Registration of Swine Brands	1,317 2 6	.....	1,317 2 6
	Fees—Stock Foods and Medicines Act	1,248 6 0	24 3 0	1,224 3 0
	Fees—Apiaries Act	2,712 13 10	20 2 6	2,692 11 4
	Fees—Pest Destroyers Act	476 14 0	21 0 0	455 14 0
	Fees—Public Officers	81 17 8	.....	81 17 8
	Fees—Analyses	7 12 6	.....	7 12 6
	Fees—Flour Certificates.....	967 3 6	.....	967 3 6
	Fees—Testing Dairy Glassware	171 2 11	.....	171 2 11
	Forfeiture of Bonds	1,562 8 6	.....	1,562 8 6
	Fines and Forfeitures	132 0 3	.....	132 0 3
	Commission for collection of Public Service Association and Professional Officers Association Subscriptions	101 2 3	.....	101 2 3
	Commission for collection of Premiums—Group Assurance Scheme	496 18 10	.....	496 18 10
	Commission for collection of Metropolitan Hospitals Fund and Medical Benefits Fund Contributions ...	107 6 0	.....	107 6 0
	Interest on Advances—Dingo Extermination	28 2 6	.....	28 2 6
	Sale of Government Property	181 19 6	.....	181 19 6
	Sundry Sales	77 12 5	36 18 3	40 14 2
	Transfer of Part Balances	193 17 6	.....	193 17 6
	Exchange on Cheques and Remittances	206 11 10	.....	206 11 10
	Three Per Cent. Contribution by Pastures Protection Boards	16,628 3 2	.....	16,628 3 2
	Broadcasting Fees	68 8 1	50 1 8	18 6 5
	Postages	44 17 9	.....	44 17 9
	Licence Fees—Pastures Protection Act	8 0 0	0 10 0	7 10 0
	Contributions re Scholarships	225 1 0	.....	225 1 0
	Costs recovered by Crown Solicitor in various actions .....	.....	.....	.....
	Refund of remuneration received from Film Company	24 2 0	.....	24 2 0
	Employer's Liability to the State Superannuation Fund	4,841 3 4	.....	4,841 3 4
	Total	34,890 7 3	191 19 1	34,698 8 2
Division of Plant Industry	Fees—Seed Testing.....	131 7 6	0 4 9	131 2 9
	Fees—Certification of Seed, etc.	4,401 7 10	13 7 0	4,388 0 10
	Contribution by Commonwealth Government Administration of Plant Quarantine	969 6 6	.....	969 6 6
	Commonwealth Contribution towards cost of Experimental and Demonstration Work in connection with Tobacco Leaf Production	3,036 3 0	.....	3,036 3 0
	Total	8,538 4 10	13 11 9	8,524 13 1

STATEMENT OF REVENUE AND RECEIPTS—CONSOLIDATED REVENUE FUND—FINANCIAL YEAR 1954-55—continued.

Section.	Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
		£ s. d.	£ s. d.	£ s. d.
Division of Horticulture	Inspection Fees—Plant Diseases Act	19,920 16 7	9 4 0	19,893 12 7
	Fees—Certification of Seed Potatoes	648 15 3	.....	648 15 3
	Contribution by Commonwealth Government Admin- istration of Plant Quarantine	16,309 4 0	.....	16,309 4 0
	Contribution by Commonwealth Government Admin- istration of Commerce Act	6,617 1 1	.....	6,617 1 1
	Total	43,477 16 11	9 4 0	43,468 12 11
Division of Dairying	Commonwealth Grant—Herd Recording	16,432 6 3	.....	16,432 6 3
	Fees—Herd Recording	29,324 8 11	25 16 6	29,298 12 5
	Fees—Dairy Industry Act.....	823 18 6	.....	823 18 6
	Fees—Dairy Science Schools.....	140 17 2	.....	140 17 2
	Total	46,721 10 10	25 16 6	46,695 14 4
Division of Animal Industry— Head and District Offices.	Fees—Cattle Export	63 19 0	.....	63 19 0
	Fees—Chicken Sexing Examinations .....	.....	.....	.....
	Fees—Inspection of Honey	26 7 6	0 5 0	26 2 6
	Fees—Pullorum Testing of Fowls .....	.....	.....	.....
	Fees—T.B. Tests of Cattle	191 1 6	.....	191 1 6
	Fees—Testing for Brucellosis in Cattle .....	.....	.....	.....
	Fees—Testing for Brucellosis in Swine .....	.....	.....	.....
	Fees—Vaccination of Calves	57 14 0	.....	57 14 0
	Contribution by Commonwealth Government— Administration of Animal Quarantine.....	10,671 4 8	.....	10,671 4 8
	Fees—Meat Industry Act	156,896 6 5	0 2 0	156,896 4 5
	Contribution <i>re</i> Testing for Tuberculosis of Herds.....	3,386 12 3	.....	3,386 12 3
	Sale of Livestock, Sheepskins, etc.—Glenfield Veterinary Research Station	1,522 19 6	12 6 8	1,510 12 10
	Private Telephone Calls—Glenfield Veterinary Research Station	21 18 1	.....	21 18 1
	Electricity supplied to Officers—Glenfield Veterinary Research Station	95 1 9	.....	95 1 9
	Exchange on Cheques and Remittances—Glenfield Veterinary Research Station	1 16 0	.....	1 16 0
	Rents—Glenfield Veterinary Research Station	238 10 1	.....	238 10 1
	Subscriptions to Glenfield Veterinary Research Station	1,447 14 0	.....	1,447 14 0
	Total	174,621 4 9	12 13 8	174,608 11 1
Division of Animal Industry— Queensland Border Area.	Fees—for Dipping Stock	1,120 7 5	.....	1,120 7 5
	Rents	610 1 8	3 2 6	606 19 2
	Exchange on Cheques and Remittances	2 13 0	.....	2 13 0
	Total	1,732 2 1	3 2 6	1,729 19 7
Division of Animal Industry— Tick Quarantine Areas.	Fumigation Fees	30 8 4	.....	30 8 4
	Rents	26 0 0	.....	26 0 0
	Contribution by commonwealth Government in respect of Cattle Tick Eradication	250,000 0 0	.....	250,000 0 0
	Total	250,056 8 4	.....	250,056 8 4
Botanic Gardens and Allied Activities.	Rents exclusive of Land	3,924 19 4	0 7 6	3,924 11 10
	Rents	496 0 1	.....	496 0 1
	Lavatory Takings	167 2 11	.....	167 2 11
	Contribution by Commonwealth Government— Maintenance of Gardens at Admiralty House	4,640 18 1	.....	4,640 18 1
	Total	9,229 0 5	0 7 6	9,228 12 11
Grain Elevators	Rental of Wheat Stacking Sites	2,898 13 8	17 10 0	2,881 3 8
	Handling Fees, etc.....	921,984 1 10	.....	921,984 1 10
	Sale of Government Property .....	.....	.....	.....
	Hire of Test Weights	8 0 0	.....	8 0 0
	Rents	53 8 6	3 18 6	49 10 0
	Total	924,944 4 0	21 8 6	924,922 15 6
	Grand Total—Central Administration, etc.	1,494,211 19 5	278 3 6	1,493,933 15 11
Department of Agriculture	Repayments to Credit of votes—Previous Years	24,593 6 11	1 12 6	24,591 14 5

SUMMARY OF RECEIPTS.

Particulars.	Receipts (Gross).	Receipts Returned.	Nett Receipts.
	£ s. d.	£ s. d.	£ s. d.
Agricultural Colleges, Farms, Stations and Nurseries	163,145 18 7	1,375 19 11	161,769 18 8
Central Administration, etc.	1,494,211 19 5	278 3 6	1,493,933 15 11
Department of Agriculture—Repayments to Credit of Votes—Previous Years	24,593 6 11	1 12 6	24,591 14 5
	£ 1,681,951 4 11	1,655 15 11	1,680,295 9 0

EXPENDITURE FINANCIAL YEAR, 1954-55—CENTRAL ADMINISTRATION, DIVISION OF PLANT INDUSTRY, DIVISION OF DAIRYING, HAWKESBURY AGRICULTURAL COLLEGE, WAGGA AGRICULTURAL COLLEGE, EXPERIMENT FARM AND NURSERIES, DIVISION OF ANIMAL INDUSTRY (HEAD AND DISTRICT OFFICES), QUEENSLAND BORDER, TICK QUARANTINE AREAS, BOTANIC GARDENS AND ALLIED ACTIVITIES AND GRAIN ELEVATORS.

Section.	Consolidated Revenue Fund.										General Loan Account.	Expenditure by Other Departments.										Grand Total Expenditure.											
	Salaries and Payments in the nature of Salary.					Maintenance and Working Expenses other than Salaries.						Other Services.					Total.																
	£	s.	d.	£	s.	d.	£	s.	d.	£		s.	d.	£	s.	d.	£	s.	d.	£	s.		d.										
Central Administration—	405,265	7	9	40,989	16	4	36,139	12	8	482,394	16	9	2,950	0	0	485,344	16	9	32,471	10	1	28,796	19	10	23,260	14	5	570,142	15	3			
Division of Plant Industry—	127,643	14	7	29,177	11	6	3,868	10	3	160,689	16	4	.....	.....	.....	160,689	16	4	.....	.....	.....	994	14	4	2,068	14	5	163,079	18	3			
Division of Horticulture—																																	
Fruit	89,947	11	2	20,798	5	10	3,228	2	9	113,973	19	9	.....	.....	.....	113,973	19	9	.....	.....	.....	441	8	8	11	7	3	115,598	5	0			
Export and Import Branch.	12,979	9	1	2,468	2	8	975	0	0	16,422	10	9	.....	.....	.....	16,422	10	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,445	1	3			
Plant Quarantine Service	16,377	6	4	1,036	5	6	.....	.....	.....	17,413	11	10	.....	.....	.....	17,413	11	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,445	1	3			
Division of Dairying—																																	
General	56,716	7	7	14,851	6	10	100	0	0	71,667	14	5	.....	.....	.....	71,667	14	5	.....	.....	.....	861	18	2	.....	.....	.....	1,544	1	2			
Herd Recording	56,310	16	1	17,143	12	3	.....	.....	.....	73,454	8	4	.....	.....	.....	73,454	8	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	73,454	8	4			
Hawkesbury Agricultural College	100,560	19	4	47,383	9	9	16,741	3	8	164,685	12	9	80,663	1	4	245,348	14	1	.....	.....	.....	1,027	12	2	1,975	12	5	250,127	9	9			
Wagga Agricultural College	45,344	19	7	23,760	11	8	2,451	2	11	71,556	14	2	65,014	2	0	138,570	16	2	.....	.....	.....	629	16	1	663	16	3	137,769	8	6			
Alisonville Tropical Fruit Research Station	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Bathurst Experiment Farm	11,969	16	10	10,790	17	11	435	7	4	23,196	2	1	639	15	0	884	14	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	884	14	7			
Comodol Experiment Farm	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Cooma Research Station	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Gosford Citrus Research Station	8,884	6	6	3,096	9	8	326	13	3	426	7	3	12,637	3	5	23,767	18	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	90	3	7			
Griffith Experiment Farm	24,516	11	0	7,483	0	3	317	3	6	33,063	11	4	400	0	0	33,378	9	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	5	0			
Griffith Viticultural Nursery	4,536	12	0	986	3	2	133	0	3	5,655	15	5	.....	.....	.....	5,655	15	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	97	7	9			
Leeton Experiment Farm	13,078	3	8	5,757	13	1	1,897	14	2	20,733	10	11	.....	.....	.....	20,733	10	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	10	0			
New England Experiment Farm	20,724	3	8	11,078	10	10	486	7	0	32,239	1	1	.....	.....	.....	32,239	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	41	12	0			
Seven Hills Poultry Experiment Farm	12,640	1	3	5,208	10	1	611	10	5	18,460	2	7	.....	.....	.....	18,460	2	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	226	6	0			
Tanworth Agricultural Experiment Station	1,576	0	0	5,194	7	6	497	8	5	7,267	16	2	937	5	1	8,406	2	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	310	18	11			
Tanmore Experiment Farm	11,074	15	11	4,142	2	1	1,633	11	5	16,850	9	5	.....	.....	.....	16,850	9	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	67	15	8			
Trangie Agricultural Experiment Station	18,463	7	5	19,235	0	11	1,679	0	2	38,378	8	6	3,343	2	3	40,193	11	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	48	8	2			
Woolongbar Experiment Farm	13,592	14	5	6,505	0	6	1,026	5	0	25,897	12	3	.....	.....	.....	25,897	12	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	250	7	2			
Yanco Experiment Farm	32,791	5	3	13,582	7	10	7,582	19	1	53,896	12	2	1,597	10	3	55,944	2	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	19	6			
Tobacco Research	1,646	13	4	1,969	0	8	.....	.....	.....	3,615	14	0	.....	.....	.....	3,615	14	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,148	15	2			
Division of Animal Industry—																																	
Head and District Offices	103,634	9	5	24,944	13	1	31,364	13	7	159,943	16	1	.....	.....	.....	159,943	16	1	.....	.....	.....	1,568	13	7	3	0	0	846	10	10			
Headed Veterinary Research Station	33,893	12	3	10,448	10	8	1,122	0	3	46,370	11	9	906	8	7	46,370	11	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	737	14	6			
Shannon Vale	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	5	10			
Meat Inspection Service—																																	
Homebush	47,457	6	5	3,330	18	0	.....	.....	.....	50,788	4	5	.....	.....	.....	50,788	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Other Slaughteries	74,311	11	11	9,682	14	11	.....	.....	.....	83,994	6	10	.....	.....	.....	83,994	6	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Knackeries	1,459	11	6	539	18	8	.....	.....	.....	1,999	10	2	.....	.....	.....	1,999	10	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Animal Quarantine Service	9,860	13	1	871	9	10	.....	.....	.....	10,232	2	10	.....	.....	.....	10,232	2	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Queensland Border Control	35,897	0	0	9,130	14	0	2,272	12	6	47,300	12	4	3,784	18	0	51,035	12	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Tick Quarantine Areas	441,801	8	9	176,255	18	3	54,774	10	1	672,841	17	1	.....	.....	.....	672,841	17	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....			
Botanic Gardens and Allied Activities—																																	
Botanic Gardens	68,476	15	6	10,164	11	8	662	11	0	79,396	8	2	.....	.....	.....	79,396	8	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	328	17	11			
Government Domain	9,647	2	0	508	15	2	2,530	0	0	12,685	17	2	92	10	0	12,685	17	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	11	4			
Centennial Park	18,444	16	3	1,706	8	9	7,608	10	0	27,759	15	0	.....	.....	.....	27,759	15	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	64	7	1			
Government Grain Elevators (3)	175,094	19	1	105,995	12	2	825	8	11	285,916	0	2				285,916	0	2										1,997	636	2	2		
Totals	2,128,263	1	1	661,080	4	11	135,960	6	6	2,975,303	12	6	174,715	16	0	3,150,019	8	6	32,471	10	1	34,786	2	5	3,770	14	6	35,980	16	3	5,254,664	13	11

(3) The amounts shown in respect of the Government Grain Elevators cover the period 1st July, 1954, to 28th February, 1955; control of this service having been transferred from the Department of Agriculture to the Grain Elevators Board of New South Wales on 1st March, 1955.

Figures of expenditure by Premier's Department are not available.

OTHER ACCOUNTS.

Name of Account.	Balance as at 1st July, 1954.	Receipts 1954-55.	Payments 1954-55.	Balance as at 30th June, 1955.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Advances to Officers for Purchase of Motor Cars	Dr. 72,499 11 11	23,604 9 0	39,792 5 9	Dr. 88,687 8 8
Contribution towards Running Expenses of Tractor Mower at Centennial Park	120 14 9	220 0 0	110 17 0	229 17 9*
Potato Growers' Licensing Act, 1940	771 8 6	1,544 8 9	1,788 16 2	527 1 1*
Construction, Maintenance and Improvement of Public Watering Places in the Western Division	0 10 5	840 2 11	840 13 4	*
Balance of Salaries Adjustment Suspense Account	42,794 12 9	24,927 17 11	42,794 12 9	24,927 17 11*
Commonwealth and State Contributions—Bush Fire Relief Government Printing Office—Working Account and Stores Account and Sale of Publications	4,167 0 5	.....	4,167 0 5	*
Ministerial Employees Leave—Payments to Employees or Their Widows, Children, or Dependent Relatives .....	.....	645 18 0	40 16 8	605 1 4*
Noxious Insects Destruction Account	417 1 3	2 6 8	.....	419 7 11*
Swine Compensation Fund	27,718 17 6	171,989 10 10	186,642 4 0	13,066 4 4*
Treasury Fire Risks	6,910 8 9	59,431 16 8	43,114 0 4	23,228 5 1*
Purchase of Milk and Cream—Hawkesbury Agricultural College... Motor Vehicles Purchasing Account	840 0 0	.....	17 0 0	823 0 0*
Hawkesbury Agricultural College Canning Factory Account	6,386 4 8	36,339 12 11	38,040 15 3	4,685 2 4*
Deposit on Tenders	300 0 0	.....	.....	300 0 0*
Farm Produce Agents' Act, 1926	372 19 9	800 1 0	492 18 5	680 2 4*
Unclaimed Moneys Account .....	.....	590 0 0	.....	590 0 0*
Rural Training of Ex-Servicemen	577 17 10	1,000 0 0	1,357 5 6	220 12 4*
Commonwealth Grant towards the Promotion of Improved Practices in the Dairying Industry	1,351 10 9	514 0 1	1,075 7 9	790 3 1*
Compensation for Losses Sustained from Experiments Relating to The Wool Industry	1,428 5 3	2,000 0 0	2,633 6 5	794 18 10*
Flood Relief Scheme—New South Wales	12,003 15 2	66,209 5 0	58,160 9 10	20,052 10 4*
Argentine Ant Eradication Campaign	2,000 0 0	.....	.....	2,000 0 0*
Commonwealth Grant—Expansion of Agricultural Advisory Services—New South Wales	1,261 1 1	2,869 9 5	4,130 10 6	*
Flood Relief Scheme, 1954	870 5 4	7,602 5 8	8,339 19 3	132 11 9*
Flood Relief Scheme, 1954—Assistance to Churches and Denom- inational Schools	7,743 5 4	48,616 0 0	51,116 18 7	5,242 6 9*
Cattle Compensation Fund	10,431 2 10	30,047 4 1	31,491 6 2	8,987 0 9*
Flood Relief Scheme, 1955	4,360 0 0	.....	2,835 0 0	1,525 0 0*
Flood Relief Scheme—Contribution by Government of United Kingdom	9,544 5 7	181,777 4 2	149,823 15 7	41,497 14 2*
Grain Elevators Board Account .....	.....	788,846 6 4	700,167 0 7	88,679 5 9*
Flood Relief Scheme, 1955—Proceeds of Appeals and Contribu- tions forwarded to the Government of New South Wales for Relief of Flood Victims .....	.....	313,437 10 0	312,470 0 0	967 10 0*
Hawkesbury Agricultural College Trust Account .....	.....	236,650 0 8	223,826 4 10	12,823 15 10*
Wagga Agricultural College Trust Account	848 5 7	128,412 17 6	.....	128,412 17 6*
Advertising—Department of Agriculture Publications Account... Commonwealth Bank (Rural Credits Development Fund) Grant towards Purchase of Cameras for District Officers	874 6 2	5,994 12 4	5,752 8 4	1,090 9 7*
Commonwealth Bank (Rural Credits Development Fund) Grant towards Erection of Glasshouse, Hawkesbury Agri- cultural College	514 12 6	769 7 10	829 11 11	814 2 1*
Contribution by C.S.I.R.O. towards Cost of Research into Metabolic Diseases of Sheep and Endocrinology—Glenfield Veterinary Research Station .....	.....	7,580 13 11	7,493 6 2	602 0 3*
Contribution by Hawkesbury Agricultural College Old Boys' Union towards Memorial Library	0 19 10	.....	.....	0 19 10*
Contributions by States towards Salary and Expenses of Patrol Officer, Grasshopper Control	2,000 0 0	.....	.....	2,000 0 0*
Contributions towards Establishment of Library at Agricultural Research Institute, Wagga	450 11 0	1,185 0 0	1,635 11 0	*
Cowra Machinery Pool Hire Charges Account	5,000 0 0	.....	5,000 0 0	*
Department of Agriculture Suspense Account .....	.....	2,493 4 0	2,493 4 0	*
Fat Steer Competition—Wagga Abattoirs .....	.....	279 0 0	.....	279 7 0*
Fire Damage Account	100 0 0	12 12 0	67 2 5	45 9 7*
Hawkesbury Agricultural College Egg Laying Competition Prize Fund .....	.....	34 10 0	34 10 0	*
Honey Marketing Board	5,400 14 6	22,942 5 7	25,815 14 11	2,527 5 2*
Horse Breeding Fund .....	.....	30 0 0	30 0 0	*
Interstate Meat Co. Pty. Ltd.—Bursary—Wagga	426 10 0	.....	.....	426 10 0*
Leeton Machinery Pool Hire Charges Account	598 19 10	304 14 6	682 10 9	221 3 7*
McGarvie Smith Institute—Contribution towards Running Costs of Nutritional Station at Glen Innes	20 0 0	.....	.....	20 0 0*
McGarvie Smith Institute—Contribution to Nutritional Research Laboratory, Glenfield	2,245 6 2	.....	.....	2,245 6 2*
Overseas Trip—Dr. C. J. Magee	4 7 7	.....	.....	4 7 7*
Pastures Protection Boards of New South Wales—Subsidy to Glenfield Veterinary Research Station	1 5 5	14 19 6	16 4 11	*
W. S. Pender Memorial Fund—Interest on Bonds	2,779 7 9	4,308 9 6	3,904 15 10	3,183 1 5*
Rice Research Laboratory, Yanco	1,415 0 0	.....	108 6 0	1,306 14 0*
Sale of Booklet "The Home Vegetable Garden"	101 3 0	.....	101 3 0	*
Sale of Book "Farm Management and Elementary Agricultural Economics"	420 19 5	1,200 0 0	1,528 13 11	92 5 6*
Sale of Rural Training Booklets—Wagga	139 17 9	31 5 0	3 2 6	168 0 3*
Stamp Duty on Agreement—Wheat Stacking Sites	1,000 0 0	1,000 0 0	.....	2,000 0 0*
Toxaemic Jaundice Investigations	42 7 11	.....	.....	42 7 11*
Tropical Fruit Research Station	176 8 11	0 3 11	176 8 11	0 3 11*
Unclaimed Salaries and Wages	11 19 0	17 13 1	29 1 6	0 10 7*
.....	0 18 8	1 4 11	2 3 7	*
.....	1 5 0	21 10 0	12 5 0	10 10 0*
.....	11 18 11	.....	.....	11 18 11*
.....	5,000 0 0	.....	.....	5,000 0 0*
.....	628 13 4	1,287 11 6	1,460 4 6	456 0 4*
Total	£ 100,087 14 3	2,178,427 5 2	1,962,445 14 3	316,069 5 2

APPENDIX II.

Published Papers, 1954-55, in the fields of Veterinary and Allied Research.

- Beattie, H. E. R. (1954)—Warts on cattle. Yrbk. Inst. Inspectors of Stock of N.S.W.
- Beattie, H. E. R. (1955)—Bovine trichomoniasis (being a letter to the Editor). Aust. Vet. J. 31: 83.
- Beattie, H. E. R. (1955)—Trichomoniasis. Aust. Vet. Conference, Melbourne, May, 1954. Aust. Vet. J. 31: 42-43, 45.
- Dun, R. B. (1955)—Cervix of the ewe, its importance in artificial insemination of sheep. Aust. Vet. J. 31: 101-3.
- Dun, R. B. (1955)—Puberty in merino rams. Aust. Vet. J. 31: 104-6.
- Forbes, B. R., Keast, J. C. and Wannam, J. S. (1954)—Serological survey of cattle in New South Wales for Q fever infection. A preliminary report. Aust. Vet. J. 30: 266-8.
- Forbes, B. R., Keast, J. C., Wannam, J. S. and Lawrence, J. J. (1955)—Occurrence of antibodies for the leptospira grippotyphosa sero group in bovine sera in New South Wales. Aust. Vet. J. 31: 69-75.
- Franklin, M. C., McClymont, G. L., Biggs, P. K. and Campbell, B. L. (1955) Maintenance rations for merino sheep. Pt. 2. The performance of weaners fed daily and weekly on rations of wheat and wheaten chaff at maintenance levels and the effect thereon of vitamin A supplements. Aust. J. Ag. Res. 6: 324-42.
- Hewetson, R. W. (1954)—Artificial insemination and infertility in cattle. Yrbk. Inst. Inspectors of Stock of N.S.W.
- Hewetson, R. W. (1955)—Storage time as a factor limiting the fertilizing capacity of bovine semen stored at 5°C. Aust. Vet. J. 31: 129-131.
- Hewetson, R. and Carter, P. D. (1955)—Unusual neoplasm in the uterus of a cow. Aust. Vet. J. 31: 80.
- Keast, J. C. (1954)—Anthrax vaccination. Aust. Vet. J. 30: 251.
- Keast, J. C. (1954)—Chronic copper poisoning and heliotrope poisoning of sheep. Yrbk. Inst. Inspectors of Stock of N.S.W.
- Keast, J. C. and McBarron, E. J. (1954)—Case of bovine enterotoxaemia. Aust. Vet. J. 30: 305.
- Lockhart, L. W. (1954)—Sampling of fleeces for yield staple length and crimps per inch measurement. Aust. J. Ag. Res. 5: 55-67.
- Lockhart, L. W. and Philpotts, Helen R. (1954)—Fleece density grading of merino sheep. Aust. Vet. J. 30: 262-5.
- Morley, F. H. W. (1954)—New lethal factor in Australian merino sheep. Aust. Vet. J. 30: 237-40.
- Morley, F. H. W. (1954)—Importance of genetic control of undesirable recessive genes in livestock. J. Aust. Inst. Ag. Sci. 20: 143-50.
- Morley, F. H. W. (1955)—Selection for economic characters in Australian merino sheep. Pt. 5. Further estimates of phenotypic and genetic parameters. Aust. J. Ag. Res. 6: 77-90.
- Morley, F. H. W., Lockhart, L. W. and Davis, E. C. (1955)—Value of production from a clipped measured area as an index of fleece weight. Aust. J. Ag. Res. 6: 91-8.
- Mylrea, P. J. (1955)—Rugging dairy cows. Does it pay? Ag. Gaz. N.S.W. 66: 125-7.
- Mylrea, P. J. and McClymont, G. L. (1954)—Mineral deficiencies in cattle and the use of mineral supplements. Ag. Gaz. N.S.W. 66: 538-45.
- McBarron, E. J. (1954)—Algal poisoning in livestock. Yrbk. Inst. Inspectors of Stock of N.S.W.
- McBarron, E. J. (1955)—An annotated enumeration of plants in the Albury, Holbrook, Tumbarumba Districts of New South Wales. Contributions from the N.S.W. Nat. Herb. v. 2 (no. 2) 89-147.
- McBarron, E. J. (1955)—Milk Fever in dairy cows. Ag. Gaz. N.S.W. 66: 14-17, 53.
- McClymont, G. L. (1954)—Minerals and licks for sheep. Ag. Gaz. N.S.W. 65: 567-72; 646-51.
- McClymont, G. L. (1954)—Paresis associated with spinal cord myelin sheath degeneration in new born pigs. Aust. Vet. J. 30: 345-6.
- McClymont, G. L. and Duncan, D. C. (1955)—Studies on the nutrition of Poultry. No. 5. Comparative value of synthetic riboflavin and natural vitamin B complex rich feeds for supplementing wheatmeal rations for hatchability. Aust. Vet. J. 31: 91-2.
- McClymont, G. L. and Setchell, B. P. (1955)—Ovine pregnancy toxæmia. I. Tentative identification as a hypoglycaemia encephalopathy. Aust. Vet. J. 31: 53-68.
- McClymont, G. L. and Wynne, K. N. (1955)—Possibility of photosensitization due to ingestion of aphids (being a letter to the Editor). Aust. Vet. J. 31: 112.
- McDonald, M. W. (1955)—Failure of chickens to respond to arsanilic acid. Poult. Sci. 34: 55-6.
- McDonald, M. W. and McClymont, G. L. (1955)—Studies on the nutrition of poultry. No. 6. Effect of simplified breeding ration on hatchability and growth and visibility of chickens. Aust. Vet. J. 31: 93-7.
- Robinson, M. (1954)—Recent developments in molluscicides. Yrbk. Inst. Inspectors of Stock of N.S.W.
- Sinkovic, B. (1954)—Tuberculosis in a grey teal duck (*Querquedula gibberifrons*). Aust. Vet. J. 30: 215.
- Sinkovic, B. and Robinson, M. (1955)—*Epidermoptes bilobatus* in turkey poults. Aust. Vet. J. 31: 98-100.
- Wynne, K. (1954)—Compound F excretion in the sheep. Aust. J. Sci. 17: 36-7.
- Wynne, K. and McClymont, G. L. (1955)—Copper-molybdenum-sulphate interaction in induction of hypocuprosis. Nature 175: 471-2.

